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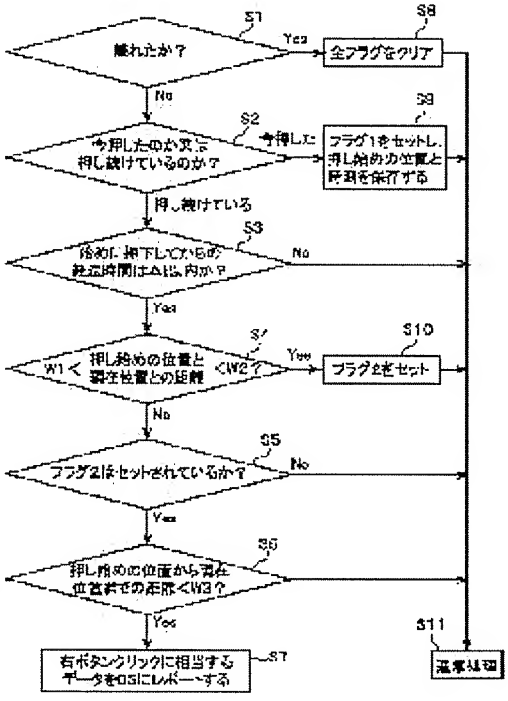
(54) INFORMATION PROCESSOR, PROGRAM, AND COORDINATE INPUT METHOD

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a technology for easily switching different operations to input coordinates without making it necessary to preliminarily change the setting even when a coordinate input means capable of inputting the coordinates of only one point at the same time is used.

SOLUTION: When first coordinates are inputted, whether or not second coordinates away from the first coordinates by a prescribed distance or more are inputted within a prescribed time is determined (steps S2-S4, S9), or after the first coordinates are inputted, whether or not the second coordinates away from the first coordinates by the prescribed distance or more are inputted with the prescribed time, and whether or not third coordinates in the prescribed neighborhood of the first coordinates are inputted afterwards within the prescribed time is determined (steps S2-S6, S9, S10), and first processing (a step S11) based on the first coordinates or second processing (a step S7) based on the first coordinates is executed according to the determination result.



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CLAIMS

[Claim(s)]
[Claim 1] A means to judge whether the input of the 2nd coordinate which is separated from said 1st coordinate beyond predetermined distance was in predetermined time amount after there was an input of the 1st coordinate of arbitration, The information processor characterized by providing a means to perform 1st processing based on said 1st coordinate when said judgment is negative, and a means to perform the 2nd different processing from said 1st processing based on said 1st coordinate when said judgment is affirmative.
[Claim 2] Said information processor is equipped with a computer. Said 1st processing The processing which notifies the information notified to the operating system of said computer when cursor is positioned in said 1st coordinate and the left carbon button click of a mouse is performed, and the same information to said operating system is included. Said 2nd processing The information processor according to claim 1 characterized by including the processing which notifies the information notified to said operating system when cursor is positioned in said 1st coordinate and the right carbon button click of a mouse is performed, and the same information to said operating system.
[Claim 3] A means to judge whether the input of the 3rd coordinate [/ near / predetermined / said 1st coordinate of the input of the 2nd coordinate which is separated from said 1st coordinate beyond predetermined distance, and after that] suited in predetermined time after there was an input of the 1st coordinate of arbitration, The information processor characterized by providing a means to perform 1st processing based on said 1st coordinate when said judgment is negative, and a means to perform the 2nd different processing from said 1st processing based on said 1st coordinate when said judgment is affirmative.
[Claim 4] Said information processor is equipped with a computer. Said 1st processing The processing which notifies the information notified to the operating system of said computer when cursor is positioned in said 1st coordinate and the left carbon button click of a mouse is performed, and the same information to said operating system is included. Said 2nd processing The information processor according to claim 3 characterized by including the processing which notifies the information notified to said operating system when cursor is positioned in said 1st coordinate and the right carbon button click of a mouse is performed, and the same information to said operating system.
[Claim 5] The input of each coordinate is an information processor according to claim 3 characterized by being carried out to coincidence possible [making it correspond to a depression location and performing a coordinate input] by the coordinate input means in which the coordinate input only about one point is possible.
[Claim 6] Said coordinate input means the input about the coordinate which reaches [whether the depression is made and or not] and is inputted by the depression after a depression is started until it is canceled It is what is given to an information processor with a predetermined period. Said judgment means The information processor according to claim 5 characterized by being what continues based on said input and performs said affirmative judging by making to be able to judge that the depression is made into the further conditions until there is an input of said 3rd coordinate from the input time of said

1st coordinate.
[Claim 7] The input of said 3rd coordinate is an information processor according to claim 3 characterized by being what performed when the depression for the input of said 1st coordinate is continuing.
[Claim 8] A means to judge whether the input of the 2nd coordinate which is separated from said 1st coordinate beyond predetermined distance was in predetermined time amount after there was an input of the 1st coordinate of arbitration, The program characterized by operating a computer as a means to perform the 2nd different processing from said 1st processing based on said 1st coordinate when a means to perform 1st processing based on said 1st coordinate when said judgment is negative, and said judgment are affirmative.
[Claim 9] Said 1st processing includes the processing which notifies the information notified to the operating system of said computer when cursor is positioned in said 1st coordinate and the left carbon button click of a mouse is performed, and the same information to said operating system. Said 2nd processing The program according to claim 8 characterized by including the processing which notifies the information notified to said operating system when cursor is positioned in said 1st coordinate and the right carbon button click of a mouse is performed, and the same information to said operating system.
[Claim 10] The input of the 2nd coordinate which is separated from said 1st coordinate beyond predetermined distance after there was an input of the 1st coordinate of arbitration, And a means to judge whether the input of the 3rd coordinate [/ near / predetermined / said 1st subsequent coordinate] suited in predetermined time, The program characterized by operating a computer as a means to perform the 2nd different processing from said 1st processing based on said 1st coordinate when a means to perform 1st processing based on said 1st coordinate when said judgment is negative, and said judgment are affirmative judgings.
[Claim 11] Said 1st processing includes the processing which notifies the information notified to the operating system of said computer when cursor is positioned in said 1st coordinate and the left carbon button click of a mouse is performed, and the same information to said operating system. Said 2nd processing The program according to claim 10 characterized by including the processing which notifies the information notified to said operating system when cursor is positioned in said 1st coordinate and the right carbon button click of a mouse is performed, and the same information to said operating system.
[Claim 12] The input of each coordinate is a program according to claim 10 characterized by being carried out to coincidence possible [making it correspond to a depression location and performing a coordinate input] by the coordinate input means in which the coordinate input only about one point is possible.
[Claim 13] Said coordinate input means the input about the coordinate which reaches [whether the depression is made and or not] and is inputted by the depression after a depression is started until it is canceled It is what is given to said computer with a predetermined period. Said judgment means The program according to claim 12 characterized by being what continues based on said input and performs said affirmative judging by making to be able to judge that the depression is made into the further conditions until there is an input of said 3rd coordinate from the input time of said 1st coordinate.
[Claim 14] The input of said 3rd coordinate is an information processor according to claim 10 characterized by being what performed when the depression for the input of said 1st coordinate is continuing.
[Claim 15] In order to make an information processor perform 1st processing based on the 1st coordinate of arbitration In order to make said information processor perform the 1st process performed using a coordinate input means by which the input of said 1st coordinate can be made to be able to respond to a depression location, and a coordinate input can be performed, and the 2nd different processing from said 1st processing based on the 1st coordinate of arbitration The coordinate input approach characterized by providing the 2nd process which performs the input of the 1st coordinate, and the input of the 2nd coordinate which is separated from the 1st coordinate within subsequent predetermined time beyond predetermined distance using said coordinate input means.
[Claim 16] The coordinate input approach according to claim 15 characterized by performing the input

of said 1st coordinate and the 2nd coordinate with two fingers different, respectively.
[Claim 17] In order to make an information processor perform 1st processing based on the 1st coordinate of arbitration The 1st process inputted using a coordinate input means by which the input of said 1st coordinate can be made to be able to respond to a depression location, and a coordinate input can be performed, In order to make said information processor perform the 2nd different processing from said 1st processing based on the 1st coordinate of arbitration The coordinate input approach characterized by providing the 2nd process which uses said coordinate input means and performs the input of that 1st coordinate, the 2nd coordinate which is distant from there beyond predetermined distance, and the 3rd coordinate [/ near / predetermined / that 1st coordinate] in predetermined time in this sequence.
[Claim 18] Said coordinate input means is what gives the input about the coordinate which reaches [whether the depression is made and or not] and is inputted by the depression to said information processor with a predetermined period. Said input of the 1st - the 3rd coordinate by inputting said 2nd coordinate and lifting said 2nd finger after that by the depression with 2nd another finger, inputting said 1st coordinate and continuing the depression by the depression with the 1st finger The coordinate input approach according to claim 17 characterized by carrying out by inputting said 3rd coordinate with said 1st finger with which the depression is continued.
[Claim 19] Said coordinate input means is the coordinate input approach according to claim 17 characterized by the coordinate input only about one point being possible at coincidence.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the approach of inputting a coordinate in order to make the processing based on an input coordinate perform to the program for operating a computer with performing processing based on the information processor and input coordinate which perform processing based on an input coordinate, and an information processor.
[0002]
[Description of the Prior Art] Generally, in a personal computer equipped with a touch panel etc., the tap actuation to a touch panel is treated as the same actuation as the left carbon button click of a mouse. For this reason, selection of an object, program execution, etc. can be easily performed only by carrying out the tap of the touch panel. However, it is necessary to make a setting change for actuation of a touch panel to perform processing performed when the right carbon button click of a mouse is performed conventionally, and same processing so that tap actuation may be treated as a right carbon button click in advance. Moreover, again, it is necessary to make a setting change to perform processing performed after that when a left carbon button click is performed, and same processing so that tap actuation may be treated as a left carbon button click. That is, in order to change suitably the processing corresponding to the left carbon button click of a mouse, and the processing corresponding to a right carbon button click and to make them perform by tap actuation, to make a setting change is needed each time.
[0003] Then, by JP,2000-181630,A, in order setting modification is unnecessary and to enable it to perform the change of this processing, when location directions of 2nd another coordinate location are performed continuing location directions of the 1st coordinate location on a touch panel, the touch panel system which was made to perform processing corresponding to the right carbon button click of a mouse is proposed. Here, location directions do not only mean only pushing the location, and the coordinate of the location is inputted and means being detected. Therefore, in the technique which this official report proposes, the input of the 1st coordinate location and the input of the 2nd coordinate location are performed to coincidence, and let it be the requirements for performing processing corresponding to a right carbon button click to be detected.
[0004]
[Problem(s) to be Solved by the Invention] However, since it is considering as the requirements for performing processing corresponding to a right carbon button click for there being a coincidence input of the 1st and 2nd coordinate location according to this conventional technique, in order to make the processing corresponding to a right carbon button click perform, it is necessary to use what can accept an input of two points which is different in coincidence as a touch panel used for a coordinate input. Therefore, the cheap pressure-sensitive type touch panel which can input only the coordinate of one point cannot be used for coincidence, but touch panels, such as an expensive surface-acoustic-waves method which can input the coordinate of two or more points into coincidence, must be used.
[0005] The purpose of this invention is to offer the technique in which different processing based on an input coordinate can be changed that prior setting modification is unnecessary and easily, and can be

made to perform, even when using for coincidence a coordinate input means by which only the coordinate input about one point can be performed, in view of the trouble of this conventional technique.

[0006]
[Means for Solving the Problem] In order to attain this purpose, the information processor concerning this invention possesses a judgment means to perform a predetermined judgment, a means to perform 1st processing based on said 1st coordinate when said judgment is negative, and a means to perform the 2nd different processing from said 1st processing based on said 1st coordinate when said judgment is affirmative. After said predetermined judgment has the input of the 1st coordinate of arbitration, and in predetermined time amount In the judgment of the 1st type to judge, whether there was any input of the 2nd coordinate which is separated from said 1st coordinate beyond predetermined distance Or after there is an input of the 1st coordinate of arbitration, the input of the 3rd coordinate [/ near / predetermined / said 1st coordinate of the input of the 2nd coordinate which is separated from said 1st coordinate beyond predetermined distance, and after that] is characterized by being the judgment of the 2nd type which judges whether it suited in predetermined time.
[0007] Here, under the category of an information processor, various computers, such as a desktop PC, a notebook computer, a mobile computer, and a workstation, are contained.
[0008] Although it requires the 2nd coordinate separating from the 1st coordinate beyond predetermined distance, and being inputted in predetermined time, the value of predetermined distance and predetermined time is set up in consideration of the ease of distinction with the input for other purposes, ease, quick nature of an input, etc. The input touched while making a touch panel top slide as an input for other purposes, in order to drag, for example, and an input which gives the effectiveness as a double click of a mouse by touching the same location twice mostly within a fixed period correspond. If the value of predetermined distance is too small, distinction with a double click or a drag will become ambiguous. If predetermined distance is too large, it will be hard coming to do the actuation in the case of inputting by the index finger and the middle finger with a touch panel. A quick input becomes impossible when predetermined time is too long. In consideration of these points, predetermined distance is set as 1cm and predetermined time is set as 0.5 - 1 second. You may enable it to change these set points according to liking of a user.
[0009] Especially the upper limit of the distance between both coordinates does not need to set just separated [the 2nd coordinate] from the 1st coordinate beyond predetermined distance. Although it is not necessary to also limit especially the direction of the 2nd coordinate over the 1st coordinate, semantics is given in the direction and you may make it change the contents of the 2nd processing into it according to the direction.
[0010] Although it requires that the 3rd coordinate is near [predetermined] the 1st coordinate, the same location as the 1st coordinate is also included near [this] predetermined. Also with the intention that the user has touched the same location, the range of predetermined near is appointed on the basis of the range where an input coordinate is changed, when a touch location carries out minute fluctuation. Specifically, the range of 0.5mm radius centering on the 1st coordinate corresponds. You may enable it to change this setup according to the situation according to a user's individual.
[0011] Although it requires that the 3rd coordinate is inputted in predetermined time from the input of the 1st coordinate, the value of this predetermined time is appropriately set up in consideration of the ease of distinction with the ease of alter operation, quick nature, and other alter operation etc. Specifically, 0.5 - 1 second corresponds. A user may enable it to change this setup according to a request.
[0012] The coordinate input means in which the coordinate input only about one point is possible can perform the input of each coordinate to coincidence possible [making it correspond to for example, a depression location, and performing a coordinate input]. As such a coordinate input means, a pressure-sensitive type [for example,] (resistance film type) and capacity-coupling-type touch panel can be used.

[0013] A coordinate input means gives the input about the coordinate which usually reaches [whether

the depression is made and or not] and is inputted by the depression to an information processor with a predetermined period after a depression is started until it is canceled. An affirmative judging may be performed for the ability to be judged that the depression is continuously made until a judgment means to judge the 2nd type has the input of the 3rd coordinate from the input time of the 1st coordinate based on this input as further conditions.

[0014] When a judgment means is what judges the 1st type, the input of the 1st and 2nd coordinates can be easily performed using a touch-type coordinate input device, such as a touchpad, by touching in order by two fingers, for example, index fingers, and the middle finger. in this case -- as the processing very easily and quickly based on the 1st coordinate -- the 1st processing -- or the 2nd processing can be chosen and performed.

[0015] When a judgment means is what judges the 2nd type, the input of the 1st - the 3rd coordinate for example The input about the coordinate which reaches [whether the depression is made and or not] as a coordinate input means, and is inputted by the depression after a depression is started until it is canceled Inputting the 1st coordinate and continuing the depression by the depression with the 1st finger, using what is given to an information processor with a predetermined period, the 2nd coordinate can be inputted by the depression with 2nd another finger, and it can carry out easily by lifting the 2nd finger after that. At this time, the 3rd coordinate will be inputted with the 1st finger with which the depression is continued. Thus, the input of the 3rd coordinate may be performed when the depression for the input of the 1st coordinate is continuing.

[0016] As a coordinate input means, not only the one-point type thing in which the coordinate input only about one point is possible to coincidence but the thing of the multipoint type which can push two or more points on coincidence, and can input two or more coordinates can be used. For that purpose, what is necessary is just to add processing in which those input coordinates are changed into the coordinate of one point of those middle points or a center of gravity, when coincidence has the coordinate input of two or more points. Anyway, the input timing of the 3rd coordinate is in agreement when the 2nd finger is lifted. As a multipoint type touch panel, the thing of a digital (matrix) method, an optical (infrared radiation) scanning mode, and a surface-acoustic-waves method can be used, for example.

[0017] A tablet besides a touch panel, a touchpad, etc. can also be used as a coordinate input means. As a touch location detection method in these coordinate input means, a pressure-sensitive type (resistance film type), a digital (matrix) method, an optical (infrared radiation) scanning mode, a capacity-coupling method, and a surface-acoustic-waves method can be held, for example.

[0018] According to the information processor concerning this invention, in order to perform alternatively the 1st processing and the 2nd processing based on the 1st coordinate, corresponding to the existence of the 3rd coordinate further, corresponding to the existence of the input of the 1st coordinate according to this invention, and the 2nd coordinate, as processing based on the 1st coordinate, the 1st processing and the 2nd processing can be used properly easily, and can be performed. In that case, since the coincidence input of the 1st coordinate and the 2nd coordinate is not made into the requirements for performing the 2nd processing, the cheap coordinate input means in which the coordinate input only about one point is possible can be used for coincidence. The processing which notifies the information notified to the operating system of the computer of an information processor when it follows, for example, cursor is positioned in the 1st coordinate and the left carbon button click of a mouse is performed, and the same information to an operating system is included in the 1st processing. By including the processing which notifies the information notified to an operating system when cursor is positioned in the 1st coordinate and the right carbon button click of a mouse is performed, and the same information to an operating system in the 2nd processing By the cheap configuration, the processing corresponding to the left carbon button click of a mouse and a right carbon button click can be changed easily, and an information processor can be performed. In addition, since it is making for there to have been an input of the 3rd coordinate further into the requirements for performing the 2nd processing compared with the case where it is what judges the 1st type when a judgment means is what judges the 2nd type, alter operation for performing the 2nd processing can be performed that there is more certainly no operation mistake.

[0019] The program concerning this invention operates a computer as a means to perform the 2nd different processing from said 1st processing based on said 1st coordinate, when a means to perform 1st processing based on said 1st coordinate when a judgment means to perform a predetermined judgment, and said judgment are negative, and said judgment are affirmative. After said predetermined judgment has the input of the 1st coordinate of arbitration, and in predetermined time amount In the judgment of the 1st type to judge, whether there was any input of the 2nd coordinate which is separated from said 1st coordinate beyond predetermined distance Or after there is an input of the 1st coordinate of arbitration, the input of the 3rd coordinate [/ near / predetermined / said 1st coordinate of the input of the 2nd coordinate which is separated from said 1st coordinate beyond predetermined distance, and after that] is characterized by being the judgment of the 2nd type which judges whether it suited in predetermined time. The operation effectiveness and the explanation about each component are the same as that of the case of the information processor concerning above-mentioned this invention.
[0020] The coordinate input approach concerning this invention in order to make an information processor perform 1st processing based on the 1st coordinate of arbitration In order to make said information processor perform the 1st process performed using a coordinate input means by which the input of said 1st coordinate can be made to be able to respond to a depression location, and a coordinate input can be performed, and the 2nd different processing from said 1st processing based on the 1st coordinate of arbitration The 2nd process which performs a predetermined coordinate input is provided. And the input of the 1st coordinate from which said predetermined coordinate input serves as a foundation of said 2nd processing, And [whether it is what performs the input of the 2nd coordinate which is separated from the 1st coordinate within subsequent predetermined time beyond predetermined distance using said coordinate input means, and] Or it is characterized by being what uses said coordinate input means and performs the input of the 1st coordinate used as the foundation of said 2nd processing, the 2nd coordinate which is distant from there beyond predetermined distance, and the 3rd coordinate [/ near / predetermined / that 1st coordinate] in predetermined time in this sequence.
[0021] Here, as an information processor, the information processor concerning above-mentioned this invention can be used. The operation effectiveness by the coordinate input approach concerning this invention is the same as that of the case of the information processor concerning above-mentioned this invention. It is the same as that of the case of the information processor which predetermined distance, predetermined time, and the contents and the concrete mode of predetermined near also require for above-mentioned this invention at the 1st coordinate used as the foundation of the 2nd processing, the 2nd coordinate and the 3rd coordinate, and a list. Moreover, the explanation same also about the concrete mode which can be applied to the input approach Sagitta label input means of the 1st coordinate used as the foundation of the 2nd processing, the 2nd coordinate, and the 3rd coordinate as the case of the information processor concerning above-mentioned this invention is applicable.
[0022]
[Embodiment of the Invention] Drawing 1 is the block diagram showing the configuration of the information processor concerning 1 operation gestalt of this invention. As shown in this drawing, this equipment accepts the coordinate input by the depression, and is equipped with the digitizer section 1 which outputs input including an input coordinate and the information (ON or OFF of a depression) on whether it is pushed or not, and the body 2 of a personal computer which performs processing based on input. The digitizer section 1 is equipped with the interface circuitry 5 by which the body 2 of a personal computer changes and outputs above-mentioned input to the signal based on serial interface specification which can be treated direct picking, such as RS232 and USB, based on the output of the touch panel 3 which outputs the analog signal (electrical-potential-difference value) x and y corresponding to the X coordinate and Y coordinate of a point which were pushed with the finger or the pen, AD converter 4 which changes this analog signal into a digital signal, and AD converter 4.
[0023] The body 2 of a personal computer is equipped with the bus 8 grade which connects CPU7 with the interface circuitry 6 and interface circuitry 6 which consisted of a USB controller, an I/O controller, etc., accepts the input from an interface circuitry 5 through an interface circuitry 6, and performs suitable processing based on input. The touch panel 3 is formed in piles on the scope of the body 2 of a

personal computer, and can input now the coordinate corresponding to a screen display by touching a screen through a touch panel 3.

[0024] Drawing 2 is an explanatory view for explaining the principle of a touch panel 3. A touch panel 3 is a pressure-sensitive-type (resistance film type) touch panel equipped with the transparent electrodes (resistance film) 21 and 22 of two sheets, as shown in this drawing. Between a transparent electrode 21 and 22, when it has countered through an opening and there is no depression, it has not flowed, but if a transparent electrode 21 is pushed with a finger or a pen, in a depression point, a transparent electrode 21 will be connected to a transparent electrode 22, and between two electrodes will be in switch-on. At this time, the electrical potential difference produced between direction edge of Y 22a of a transparent electrode 22 and 22b can be outputted as a signal y corresponding to the depression location in the direction of Y by impressing a fixed electrical potential difference between direction edge of X 21a of a transparent electrode 21, and 21b. Moreover, the electrical potential difference produced between direction edge of X 21a of a transparent electrode 21 and 21b can be outputted as a signal x corresponding to the depression location in the direction of X by impressing a fixed electrical potential difference between direction edge of Y 22a of a transparent electrode 22, and 22b.

[0025] Since the middle electrical potential difference of the electrical potential difference produced, respectively arises at the direction edges 22a and 22b of Y in direction edge of X 21a, and 21b list when two points are pushed on coincidence, and each point is pushed separately, Signal x and y are outputted as a thing of the level corresponding to the pushed middle point of two points. Therefore, even if it pushes two points on coincidence, the coordinate of each point cannot be inputted but only one point of the middle point is inputted. However, since Signal x and y which are outputted are an analog quantity which changes continuously corresponding to a depression location, the resolution about a depression location is high.

[0026] The digitizer section 1 outputs input including the information about the input coordinate from the touch panel 3 obtained by doing in this way, and the information related [whether it is that the touch panel 3 is pushed (ON) and] with (being off) to the body 2 of a personal computer until a depression is canceled of the time of depression initiation. The body 2 of a personal computer can know a present depression condition and a present input coordinate based on the input by which a sequential input is carried out.

[0027] The device driver for enabling access between the digitizer sections 1 is included in OS (operating system) of the body 2 of a personal computer. As shown in drawing 3 , the input from the digitizer section 1 is changed into the information corresponding to actuation of a mouse by the device driver 32, and is passed to OS33. OS33 passes the mouse event which shows migration and a click of a mouse cursor to application software 34 based on this information.

[0028] Drawing 4 is a flow chart which shows the procedure by device DORABA. Since the controller of the digitizer section 1 sends input with a predetermined period until a finger separates while the touch panel 3 is pushed with the finger, a device driver performs processing of drawing 4 by interruption each time. When the touch panel 3 is not pushed with a finger, processing of drawing 4 is not performed.

[0029] That is, in step S1, it judges first whether the finger separated from the touch panel 3. It judges with the finger having separated in input, when a depression was off. When it judges with the finger having separated, flags 1 and 2 are reset in step S8, it progresses to step S11, and the usual processing is performed. When the first input coordinate (henceforth "the 1st coordinate") of push saved by the below-mentioned step S9 as usual processing in this case before is left-clicked with a mouse, the processing which notifies the data notified to OS and the same data to OS is included.

[0030] having progressed to step S2 and having been now pushed, when it judged with the finger not being separated in step S1 -- or it judges whether it is continue being pushed. That is, the flag 1 which shows that the depression is continued is off, and it judges with having been now pushed, when the depression was ON, and judges with continuing being pushed, if a flag 1 is ON and a depression is ON. When it judges with having been pushed now, while setting a flag 1 in step S9, the input coordinate (the 1st coordinate) shown by input is saved with current time of day as the first location of push, after that, it progresses to step S11 and the usual processing is performed. The processing which notifies the data

for moving cursor to the input coordinate which input shows, for example as usual processing in this case to OS is included.

[0031] In step S2, it judges whether the elapsed time after it progresses to step S3 when it judges with continuing being pushed, and a depression is started is less than deltat. Elapsed time can be acquired based on the time of day saved by step S9, and the present time of day at the time of initiation of the depression. When it judges with elapsed time not being less than deltat, it progresses to step S11, and the usual processing is performed. The processing which notifies the data for moving cursor to the input coordinate which input shows as usual processing in this case, for example to OS corresponds. Moreover, as deltat, 0.5 - 1 second is set up, for example.

[0032] When it judges with elapsed time being less than deltat in step S3, it progresses to step S4 and judges whether the distance of the location at the time of the depression initiation saved by step S9 at the time of depression initiation (the 1st coordinate) and the current position (input coordinate) is more greatly [than W1] smaller than W2. When this distance judges with it being larger than W1, and being smaller than W2, a flag 2 is set in step S10, after that, it progresses to step S11 and the usual processing is performed. That is, when there is an input of the 1st coordinate, the depression is continuing from from, and that a flag 2 is ON shows that the coordinate which separated one or more [W] was newly inputted from the 1st coordinate within time amount deltat from the input of the 1st coordinate. However, this new input coordinate (henceforth "the 2nd coordinate") turns into a coordinate of the middle point of the 1st coordinate and a depression location. As processing, the processing which notifies the data for [in step S11 in this case] moving cursor, for example to the 2nd coordinate to OS usually corresponds. As a value of W1, 1cm corresponds, for example. It is not necessary to perform the limit by W2.

[0033] When it judges with there being nothing with a distance of the location at the time of depression initiation and the current position "smaller more greatly than W1 than W2" in step S4, it progresses to step S5 and judges whether the flag 2 is set. The location corresponding to the 2nd coordinate which the depression in the 1st coordinate was continuing and is separated from the time of that depression initiation one or more [W] within time amount deltat is pushed, and that a flag 2 is ON at this time means that that depression was canceled after that. When it judges with the flag 2 not being set, it progresses to step S11, and the usual processing is performed. The processing which notifies the data for moving cursor to the input coordinate which input shows, for example as usual processing in this case to OS is included.

[0034] When it judges with the flag 2 being set in step S5, it progresses to step S6, and it judges whether the distance of the location at the time of the depression initiation saved by step S9 and the current position is smaller than W3. The value of W3 is set as 0.5mm. When it judges with it not being smaller than W3, it progresses to step S11, and the usual processing is performed. The processing which notifies the data for moving cursor to the input coordinate which input shows, for example as usual processing in this case to OS corresponds.

[0035] When it judges with the distance of the location at the time of depression initiation and the current position being smaller than W3 in step S6 (i.e., when the input coordinate which input shows was near less than radius W3 from the 1st coordinate, it progressed to step S7 as that into which the 3rd coordinate was inputted and the right carbon button click of a mouse is performed), the data equivalent to the data notified to OS are reported to OS. In that case, the location at the time of the depression initiation saved in step S9 as a click location (the 1st coordinate) is used. Then, OS supplies a mouse event to active application software based on this report. Application software performs processing when the 1st coordinate is right-clicked according to this mouse event.

[0036] According to this operation gestalt, when the input of the 2nd coordinate which separated exceeding the 1st coordinate to the distance W1 is in time amount deltat from the input of the 1st coordinate and there is an input of the 3rd coordinate [/ near less than W3] from the 1st coordinate after that, the data equivalent to the right carbon button click of a mouse will be reported to OS. Actuation equivalent to carrying out the right carbon button click of the icon with a mouse easily can be performed only by carrying out the tap of another location by the middle finger by this, touching the icon of the

request on a screen by the index finger.
[0037] In addition, although the touch panel 3 in this operation gestalt is a pressure-sensitive-type touch panel in which the coordinate input of only one point is possible to coincidence, if it adds processing in which those input coordinates are changed into the coordinate of one point of those middle points or a center of gravity when coincidence has the coordinate input of two or more points, it can also use for coincidence the thing in which a coordinate input is possible about two or more points as a touch panel 3.
[0038] Drawing 5 is a flow chart which shows another example of the procedure by the device driver 32. The contents of processing in steps S51-S58 are the same as step S1 of drawing 4 - S4, S7 - S9, and the contents of processing in S11 respectively. That is, processing of drawing 5 is what skipped steps S5, S6, and S10 in processing of drawing 4 . Therefore, in processing of drawing 4 , the input of the 2nd coordinate is detected in step S4. As opposed to being made to perform the report to OS of step S7 again by making to perform detection (input of the 3rd coordinate) of the location near [at the time of depression initiation] the depression location into requirements, after setting a flag 2 In processing of drawing 5 , when the input of the 2nd coordinate is detected in step S54, it will progress to step S55 immediately, and the data equivalent to a right carbon button click will be reported to OS. Also by this, the effectiveness acquired by the procedure of drawing 4 and the same effectiveness can be acquired.
[0039] In the procedure of drawing 5 , continuation of a depression is made the requirements for reporting step S55 by processing of step S52. however, this requirement -- removing -- continuation of the depression from the input point in time of the 1st coordinate -- when the input of the 2nd coordinate is after the input of the 1st coordinate, and within deltat irrespective of how, it may be made to report step S55. According to this, after the input of the 1st coordinate, since the 2nd coordinate can be inputted without continuing the depression, an input becomes easier.
[0040] in addition, an above-mentioned operation gestalt -- setting -- **** -- although the thing of a pressure-sensitive type is used as a touch panel 3, the touch panel of the thing of other methods, for example, a digital (matrix) method, an optical (infrared radiation) scanning mode, a capacity-coupling method, and a surface-acoustic-waves method may instead be used.
[0041] The touch panel of a digital (matrix) method is arranged and equipped with two or more band-like transparent electrodes 61 and two or more band-like transparent electrodes 62 in the direction of X, and the direction of Y, respectively, as shown in drawing 6 . If each transparent electrodes 61 and 62 have countered through an opening and have a depression, one of the transparent electrodes 61 and transparent electrodes 62 corresponding to the location will flow through them. A depression location is detectable by investigating which transparent electrodes 61 and 62 each transparent electrodes 61 and 62 were scanned in order, and have flowed. The resolution of a depression point is lower than the case of a pressure-sensitive type depending on the number of transparent electrodes 61 and 62. Although a theory top can detect two or more depression locations to coincidence, it depends for the number of locations detectable to coincidence on the specification of the controller to adopt. The calibration is unnecessary.
[0042] The touch panel of an optical (infrared radiation) scanning mode is arranged and equipped with the pair of many photogenic organs 71 and an electric eye 72 in the direction of X, and the direction of Y, as shown in drawing 7 . When the light which a photogenic organ 71 emits detects the location interrupted with a finger or a pen by the electric eye 72, a depression location with a finger or a pen is detected and outputted. The resolution of a depression point is lower than the case of a pressure-sensitive type depending on the number of a photogenic organ 71 and electric eyes 72. Although a theory top can detect two or more depression locations to coincidence, only the location usually pushed first is detected. It is dependent on the specification of the controller to adopt to what point it detects to coincidence. Even if the calibration is unnecessary and a blemish sticks on the surface of a panel, it is uninfluential in actuation.
[0043] The touch panel of a capacity-coupling method forms the electric conduction film in a panel front face, and has the structure which has arranged the electrode around. If uniform electric field are formed in the electric conduction film from the surrounding electrode and a finger and an exclusive pen will contact a panel front face, a current will flow and electric field will be confused. Based on this current, a

contact location is computable. Although this touch panel has the high transparency of a panel and resolution is also high, when two points are pushed on coincidence, those middle points are recognized as a depression point. Since it is not necessary to make an electrode etc. transform and to make it contact [according to this method] unlike a pressure-sensitive type or a digital type in order to make a depression point recognize, a depression point can be made to recognize only by there being little force which carries out the depression of the panel, and touching slightly. However, in order to pass a current on a front face, to use a pen, it is necessary to use the thing of dedication. Moreover, to push with a finger, it is necessary to carry out empty-handed.

[0044] The touch panel of a surface-acoustic-waves method is equipped with the reflective array 83 which reflects the supersonic wave which the dispatch child 81 of a supersonic wave (surface acoustic waves) and the receiving child 82, and the dispatch child 81 emit, and the reflective array 84 which turns to the receiving child 82 the supersonic wave which the reflective array 83 reflected, and is reflected in a list as shown in drawing 8 . Although the component for detecting the depression location of the direction of X by a diagram is shown, the component for detecting the depression location of the direction of Y which rotated the same configuration 90 degrees also exists. After being reflected in the direction of Y, or the direction of X by the reflective array 83, and the supersonic wave which the dispatch child 81 sends progressing along a panel front face by it and being further reflected by the reflective array 84, it is received by the receiving child 82, but since the distance of the route to transmit differs according to the reflective location by the reflective arrays 83 and 84, the receiving child 82 is reached with the width of face which exists in time. In order that a supersonic wave may progress the whole panel front face uniformly in the condition that there is no depression, at this time, the reinforcement of the supersonic wave which carries out incidence to the receiving child 82 becomes fixed in time. However, if a depression point with a pen or a finger is in the middle, in order that transfer of the supersonic wave passing through the location may be overdue, the receiving reinforcement in the time of day equivalent to the location becomes low. Therefore, the controller of a touch panel can compute the coordinate of a depression location based on the time of day when receiving reinforcement became low. This touch panel has the high transparency of a panel, and its resolution of an input coordinate is also high. It is also possible to input the coordinate of two or more points into coincidence. However, only the coordinate input of the location pushed first is usually accepted. It depends on the specification [what point can be inputted into coincidence] of a controller. To use a pen, it is necessary to use the thing of high dedication of the absorption coefficient of a supersonic wave.

[0045] If the description about the all directions type of the touch panel mentioned above is summarized, it will become as it is shown in the table of drawing 9 .

[0046]

[Effect of the Invention] The input of the 2nd coordinate which separated beyond the predetermined distance after the input of the 1st coordinate, and within predetermined time according to this invention as explained above, Or in order to perform alternatively the processing or the processing of the 2nd of the 1st based on the 1st coordinate according to the existence of the input of the 3rd coordinate in the 1st subsequent coordinate neighborhood further, Even when using for coincidence a coordinate input means by which only the coordinate input about one point can be performed, the 1st processing and the 2nd processing can be chosen easily, and can be performed.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the approach of inputting a coordinate in order to make the processing based on an input coordinate perform to the program for operating a computer with performing processing based on the information processor and input coordinate which perform processing based on an input coordinate, and an information processor.

[Translation done.]

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PRIOR ART

[Description of the Prior Art] Generally, in a personal computer equipped with a touch panel etc., the tap actuation to a touch panel is treated as the same actuation as the left carbon button click of a mouse. For this reason, selection of an object, program execution, etc. can be easily performed only by carrying out the tap of the touch panel. However, it is necessary to make a setting change for actuation of a touch panel to perform processing performed when the right carbon button click of a mouse is performed conventionally, and same processing so that tap actuation may be treated as a right carbon button click in advance. Moreover, again, it is necessary to make a setting change to perform processing performed after that when a left carbon button click is performed, and same processing so that tap actuation may be treated as a left carbon button click. That is, in order to change suitably the processing corresponding to the left carbon button click of a mouse, and the processing corresponding to a right carbon button click and to make them perform by tap actuation, to make a setting change is needed each time.
[0003] Then, by JP,2000-181630,A, in order setting modification is unnecessary and to enable it to perform the change of this processing, when location directions of 2nd another coordinate location are performed continuing location directions of the 1st coordinate location on a touch panel, the touch panel system which was made to perform processing corresponding to the right carbon button click of a mouse is proposed. Here, location directions do not only mean only pushing the location, and the coordinate of the location is inputted and means being detected. Therefore, in the technique which this official report proposes, the input of the 1st coordinate location and the input of the 2nd coordinate location are performed to coincidence, and let it be the requirements for performing processing corresponding to a right carbon button click to be detected.

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EFFECT OF THE INVENTION

[Effect of the Invention] The input of the 2nd coordinate which separated beyond the predetermined distance after the input of the 1st coordinate, and within predetermined time according to this invention as explained above, Or in order to perform alternatively the processing or the processing of the 2nd of the 1st based on the 1st coordinate according to the existence of the input of the 3rd coordinate in the 1st subsequent coordinate neighborhood further, Even when using for coincidence a coordinate input means by which only the coordinate input about one point can be performed, the 1st processing and the 2nd processing can be chosen easily, and can be performed.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, since it is considering as the requirements for performing processing corresponding to a right carbon button click for there being a coincidence input of the 1st and 2nd coordinate location according to this conventional technique, in order to make the processing corresponding to a right carbon button click perform, it is necessary to use what can accept an input of two points which is different in coincidence as a touch panel used for a coordinate input. Therefore, the cheap pressure-sensitive type touch panel which can input only the coordinate of one point cannot be used for coincidence, but touch panels, such as an expensive surface-acoustic-waves method which can input the coordinate of two or more points into coincidence, must be used.
[0005] The purpose of this invention is to offer the technique in which different processing based on an input coordinate can be changed that prior setting modification is unnecessary and easily, and can be made to perform, even when using for coincidence a coordinate input means by which only the coordinate input about one point can be performed, in view of the trouble of this conventional technique.

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MEANS

[Means for Solving the Problem] In order to attain this purpose, the information processor concerning this invention possesses a judgment means to perform a predetermined judgment, a means to perform 1st processing based on said 1st coordinate when said judgment is negative, and a means to perform the 2nd different processing from said 1st processing based on said 1st coordinate when said judgment is affirmative. After said predetermined judgment has the input of the 1st coordinate of arbitration, and in predetermined time amount In the judgment of the 1st type to judge, whether there was any input of the 2nd coordinate which is separated from said 1st coordinate beyond predetermined distance Or after there is an input of the 1st coordinate of arbitration, the input of the 3rd coordinate [/ near / predetermined / said 1st coordinate of the input of the 2nd coordinate which is separated from said 1st coordinate beyond predetermined distance, and after that] is characterized by being the judgment of the 2nd type which judges whether it suited in predetermined time.
[0007] Here, under the category of an information processor, various computers, such as a desktop PC, a notebook computer, a mobile computer, and a workstation, are contained.
[0008] Although it requires the 2nd coordinate separating from the 1st coordinate beyond predetermined distance, and being inputted in predetermined time, the value of predetermined distance and predetermined time is set up in consideration of the ease of distinction with the input for other purposes, ease, quick nature of an input, etc. The input touched while making a touch panel top slide as an input for other purposes, in order to drag, for example, and an input which gives the effectiveness as a double click of a mouse by touching the same location twice mostly within a fixed period correspond. If the value of predetermined distance is too small, distinction with a double click or a drag will become ambiguous. If predetermined distance is too large, it will be hard coming to do the actuation in the case of inputting by the index finger and the middle finger with a touch panel. A quick input becomes impossible when predetermined time is too long. In consideration of these points, predetermined distance is set as 1cm and predetermined time is set as 0.5 - 1 second. You may enable it to change these set points according to liking of a user.
[0009] Especially the upper limit of the distance between both coordinates does not need to set just separated [the 2nd coordinate] from the 1st coordinate beyond predetermined distance. Although it is not necessary to also limit especially the direction of the 2nd coordinate over the 1st coordinate, semantics is given in the direction and you may make it change the contents of the 2nd processing into it according to the direction.
[0010] Although it requires that the 3rd coordinate is near [predetermined] the 1st coordinate, the same location as the 1st coordinate is also included near [this] predetermined. Also with the intention that the user has touched the same location, the range of predetermined near is appointed on the basis of the range where an input coordinate is changed, when a touch location carries out minute fluctuation. Specifically, the range of 0.5mm radius centering on the 1st coordinate corresponds. You may enable it to change this setup according to the situation according to a user's individual.
[0011] Although it requires that the 3rd coordinate is inputted in predetermined time from the input of the 1st coordinate, the value of this predetermined time is appropriately set up in consideration of the

ease of distinction with the ease of alter operation, quick nature, and other alter operation etc. Specifically, 0.5 - 1 second corresponds. A user may enable it to change this setup according to a request.

[0012] The coordinate input means in which the coordinate input only about one point is possible can perform the input of each coordinate to coincidence possible [making it correspond to for example, a depression location, and performing a coordinate input]. As such a coordinate input means, a pressure-sensitive type [for example,] (resistance film type) and capacity-coupling-type touch panel can be used.

[0013] A coordinate input means gives the input about the coordinate which usually reaches [whether the depression is made and or not] and is inputted by the depression to an information processor with a predetermined period after a depression is started until it is canceled. An affirmative judging may be performed for the ability to be judged that the depression is continuously made until a judgment means to judge the 2nd type has the input of the 3rd coordinate from the input time of the 1st coordinate based on this input as further conditions.

[0014] When a judgment means is what judges the 1st type, the input of the 1st and 2nd coordinates can be easily performed using a touch-type coordinate input device, such as a touchpad, by touching in order by two fingers, for example, index fingers, and the middle finger. in this case -- as the processing very easily and quickly based on the 1st coordinate -- the 1st processing -- or the 2nd processing can be chosen and performed.

[0015] When a judgment means is what judges the 2nd type, the input of the 1st - the 3rd coordinate for example The input about the coordinate which reaches [whether the depression is made and or not] as a coordinate input means, and is inputted by the depression after a depression is started until it is canceled Inputting the 1st coordinate and continuing the depression by the depression with the 1st finger, using what is given to an information processor with a predetermined period, the 2nd coordinate can be inputted by the depression with 2nd another finger, and it can carry out easily by lifting the 2nd finger after that. At this time, the 3rd coordinate will be inputted with the 1st finger with which the depression is continued. Thus, the input of the 3rd coordinate may be performed when the depression for the input of the 1st coordinate is continuing.

[0016] As a coordinate input means, not only the one-point type thing in which the coordinate input only about one point is possible to coincidence but the thing of the multipoint type which can push two or more points on coincidence, and can input two or more coordinates can be used. For that purpose, what is necessary is just to add processing in which those input coordinates are changed into the coordinate of one point of those middle points or a center of gravity, when coincidence has the coordinate input of two or more points. Anyway, the input timing of the 3rd coordinate is in agreement when the 2nd finger is lifted. As a multipoint type touch panel, the thing of a digital (matrix) method, an optical (infrared radiation) scanning mode, and a surface-acoustic-waves method can be used, for example.

[0017] A tablet besides a touch panel, a touchpad, etc. can also be used as a coordinate input means. As a touch location detection method in these coordinate input means, a pressure-sensitive type (resistance film type), a digital (matrix) method, an optical (infrared radiation) scanning mode, a capacity-coupling method, and a surface-acoustic-waves method can be held, for example.

[0018] According to the information processor concerning this invention, in order to perform alternatively the 1st processing and the 2nd processing based on the 1st coordinate, corresponding to the existence of the 3rd coordinate further, corresponding to the existence of the input of the 1st coordinate according to this invention, and the 2nd coordinate, as processing based on the 1st coordinate, the 1st processing and the 2nd processing can be used properly easily, and can be performed. In that case, since the coincidence input of the 1st coordinate and the 2nd coordinate is not made into the requirements for performing the 2nd processing, the cheap coordinate input means in which the coordinate input only about one point is possible can be used for coincidence. The processing which notifies the information notified to the operating system of the computer of an information processor when it follows, for example, cursor is positioned in the 1st coordinate and the left carbon button click of a mouse is performed, and the same information to an operating system is included in the 1st processing. By

including the processing which notifies the information notified to an operating system when cursor is positioned in the 1st coordinate and the right carbon button click of a mouse is performed, and the same information to an operating system in the 2nd processing By the cheap configuration, the processing corresponding to the left carbon button click of a mouse and a right carbon button click can be changed easily, and an information processor can be performed. In addition, since it is making for there to have been an input of the 3rd coordinate further into the requirements for performing the 2nd processing compared with the case where it is what judges the 1st type when a judgment means is what judges the 2nd type, alter operation for performing the 2nd processing can be performed that there is more certainly no operation mistake.

[0019] The program concerning this invention operates a computer as a means to perform the 2nd different processing from said 1st processing based on said 1st coordinate, when a means to perform 1st processing based on said 1st coordinate when a judgment means to perform a predetermined judgment, and said judgment are negative, and said judgment are affirmative. After said predetermined judgment has the input of the 1st coordinate of arbitration, and in predetermined time amount In the judgment of the 1st type to judge, whether there was any input of the 2nd coordinate which is separated from said 1st coordinate beyond predetermined distance Or after there is an input of the 1st coordinate of arbitration, the input of the 3rd coordinate [/ near / predetermined / said 1st coordinate of the input of the 2nd coordinate which is separated from said 1st coordinate beyond predetermined distance, and after that] is characterized by being the judgment of the 2nd type which judges whether it suited in predetermined time. The operation effectiveness and the explanation about each component are the same as that of the case of the information processor concerning above-mentioned this invention.

[0020] The coordinate input approach concerning this invention in order to make an information processor perform 1st processing based on the 1st coordinate of arbitration In order to make said information processor perform the 1st process performed using a coordinate input means by which the input of said 1st coordinate can be made to be able to respond to a depression location, and a coordinate input can be performed, and the 2nd different processing from said 1st processing based on the 1st coordinate of arbitration The 2nd process which performs a predetermined coordinate input is provided. And the input of the 1st coordinate from which said predetermined coordinate input serves as a foundation of said 2nd processing, And [whether it is what performs the input of the 2nd coordinate which is separated from the 1st coordinate within subsequent predetermined time beyond predetermined distance using said coordinate input means, and] Or it is characterized by being what uses said coordinate input means and performs the input of the 1st coordinate used as the foundation of said 2nd processing, the 2nd coordinate which is distant from there beyond predetermined distance, and the 3rd coordinate [/ near / predetermined / that 1st coordinate] in predetermined time in this sequence.

[0021] Here, as an information processor, the information processor concerning above-mentioned this invention can be used. The operation effectiveness by the coordinate input approach concerning this invention is the same as that of the case of the information processor concerning above-mentioned this invention. It is the same as that of the case of the information processor which predetermined distance, predetermined time, and the contents and the concrete mode of predetermined near also require for above-mentioned this invention at the 1st coordinate used as the foundation of the 2nd processing, the 2nd coordinate and the 3rd coordinate, and a list. Moreover, the explanation same also about the concrete mode which can be applied to the input approach Sagitta label input means of the 1st coordinate used as the foundation of the 2nd processing, the 2nd coordinate, and the 3rd coordinate as the case of the information processor concerning above-mentioned this invention is applicable.

[0022]

[Embodiment of the Invention] Drawing 1 is the block diagram showing the configuration of the information processor concerning 1 operation gestalt of this invention. As shown in this drawing, this equipment accepts the coordinate input by the depression, and is equipped with the digitizer section 1 which outputs input including an input coordinate and the information (ON or OFF of a depression) on whether it is pushed or not, and the body 2 of a personal computer which performs processing based on input. The digitizer section 1 is equipped with the interface circuitry 5 by which the body 2 of a personal

computer changes and outputs above-mentioned input to the signal based on serial interface specification which can be treated direct picking, such as RS232 and USB, based on the output of the touch panel 3 which outputs the analog signal (electrical-potential-difference value) x and y corresponding to the X coordinate and Y coordinate of a point which were pushed with the finger or the pen, AD converter 4 which changes this analog signal into a digital signal, and AD converter 4.
[0023] The body 2 of a personal computer is equipped with the bus 8 grade which connects CPU7 with the interface circuitry 6 and interface circuitry 6 which consisted of a USB controller, an I/O controller, etc., accepts the input from an interface circuitry 5 through an interface circuitry 6, and performs suitable processing based on input. The touch panel 3 is formed in piles on the scope of the body 2 of a personal computer, and can input now the coordinate corresponding to a screen display by touching a screen through a touch panel 3.
[0024] Drawing 2 is an explanatory view for explaining the principle of a touch panel 3. A touch panel 3 is a pressure-sensitive-type (resistance film type) touch panel equipped with the transparent electrodes (resistance film) 21 and 22 of two sheets, as shown in this drawing. Between a transparent electrode 21 and 22, when it has countered through an opening and there is no depression, it has not flowed, but if a transparent electrode 21 is pushed with a finger or a pen, in a depression point, a transparent electrode 21 will be connected to a transparent electrode 22, and between two electrodes will be in switch-on. At this time, the electrical potential difference produced between direction edge of Y 22a of a transparent electrode 22 and 22b can be outputted as a signal y corresponding to the depression location in the direction of Y by impressing a fixed electrical potential difference between direction edge of X 21a of a transparent electrode 21, and 21b. Moreover, the electrical potential difference produced between direction edge of X 21a of a transparent electrode 21 and 21b can be outputted as a signal x corresponding to the depression location in the direction of X by impressing a fixed electrical potential difference between direction edge of Y 22a of a transparent electrode 22, and 22b.
[0025] Since the middle electrical potential difference of the electrical potential difference produced, respectively arises at the direction edges 22a and 22b of Y in direction edge of X 21a, and 21b list when two points are pushed on coincidence, and each point is pushed separately, Signal x and y are outputted as a thing of the level corresponding to the pushed middle point of two points. Therefore, even if it pushes two points on coincidence, the coordinate of each point cannot be inputted but only one point of the middle point is inputted. However, since Signal x and y which are outputted are an analog quantity which changes continuously corresponding to a depression location, the resolution about a depression location is high.
[0026] The digitizer section 1 outputs input including the information about the input coordinate from the touch panel 3 obtained by doing in this way, and the information related [whether it is that the touch panel 3 is pushed (ON) and] with (being off) to the body 2 of a personal computer until a depression is canceled of the time of depression initiation. The body 2 of a personal computer can know a present depression condition and a present input coordinate based on the input by which a sequential input is carried out.
[0027] The device driver for enabling access between the digitizer sections 1 is included in OS (operating system) of the body 2 of a personal computer. As shown in drawing 3 , the input from the digitizer section 1 is changed into the information corresponding to actuation of a mouse by the device driver 32, and is passed to OS33. OS33 passes the mouse event which shows migration and a click of a mouse cursor to application software 34 based on this information.
[0028] Drawing 4 is a flow chart which shows the procedure by device DORABA. Since the controller of the digitizer section 1 sends input with a predetermined period until a finger separates while the touch panel 3 is pushed with the finger, a device driver performs processing of drawing 4 by interruption each time. When the touch panel 3 is not pushed with a finger, processing of drawing 4 is not performed.
[0029] That is, in step S1, it judges first whether the finger separated from the touch panel 3. It judges with the finger having separated in input, when a depression was off. When it judges with the finger having separated, flags 1 and 2 are reset in step S8, it progresses to step S11, and the usual processing is performed. When the first input coordinate (henceforth "the 1st coordinate") of push saved by the

below-mentioned step S9 as usual processing in this case before is left-clicked with a mouse, the processing which notifies the data notified to OS and the same data to OS is included.
[0030] having progressed to step S2 and having been now pushed, when it judged with the finger not being separated in step S1 -- or it judges whether it is continue being pushed. That is, the flag 1 which shows that the depression is continued is off, and it judges with having been now pushed, when the depression was ON, and judges with continuing being pushed, if a flag 1 is ON and a depression is ON. When it judges with having been pushed now, while setting a flag 1 in step S9, the input coordinate (the 1st coordinate) shown by input is saved with current time of day as the first location of push, after that, it progresses to step S11 and the usual processing is performed. The processing which notifies the data for moving cursor to the input coordinate which input shows, for example as usual processing in this case to OS is included.
[0031] In step S2, it judges whether the elapsed time after it progresses to step S3 when it judges with continuing being pushed, and a depression is started is less than deltat. Elapsed time can be acquired based on the time of day saved by step S9, and the present time of day at the time of initiation of the depression. When it judges with elapsed time not being less than deltat, it progresses to step S11, and the usual processing is performed. The processing which notifies the data for moving cursor to the input coordinate which input shows as usual processing in this case, for example to OS corresponds. Moreover, as deltat, 0.5 - 1 second is set up, for example.
[0032] When it judges with elapsed time being less than deltat in step S3, it progresses to step S4 and judges whether the distance of the location at the time of the depression initiation saved by step S9 at the time of depression initiation (the 1st coordinate) and the current position (input coordinate) is more greatly [than W1] smaller than W2. When this distance judges with it being larger than W1, and being smaller than W2, a flag 2 is set in step S10, after that, it progresses to step S11 and the usual processing is performed. That is, when there is an input of the 1st coordinate, the depression is continuing from from, and that a flag 2 is ON shows that the coordinate which separated one or more [W] was newly inputted from the 1st coordinate within time amount deltat from the input of the 1st coordinate. However, this new input coordinate (henceforth "the 2nd coordinate") turns into a coordinate of the middle point of the 1st coordinate and a depression location. As processing, the processing which notifies the data for [in step S11 in this case] moving cursor, for example to the 2nd coordinate to OS usually corresponds. As a value of W1, 1cm corresponds, for example. It is not necessary to perform the limit by W2.
[0033] When it judges with there being nothing with a distance of the location at the time of depression initiation and the current position "smaller more greatly than W1 than W2" in step S4, it progresses to step S5 and judges whether the flag 2 is set. The location corresponding to the 2nd coordinate which the depression in the 1st coordinate was continuing and is separated from the time of that depression initiation one or more [W] within time amount deltat is pushed, and that a flag 2 is ON at this time means that that depression was canceled after that. When it judges with the flag 2 not being set, it progresses to step S11, and the usual processing is performed. The processing which notifies the data for moving cursor to the input coordinate which input shows, for example as usual processing in this case to OS is included.
[0034] When it judges with the flag 2 being set in step S5, it progresses to step S6, and it judges whether the distance of the location at the time of the depression initiation saved by step S9 and the current position is smaller than W3. The value of W3 is set as 0.5mm. When it judges with it not being smaller than W3, it progresses to step S11, and the usual processing is performed. The processing which notifies the data for moving cursor to the input coordinate which input shows, for example as usual processing in this case to OS corresponds.
[0035] When it judges with the distance of the location at the time of depression initiation and the current position being smaller than W3 in step S6 (i.e., when the input coordinate which input shows was near less than radius W3 from the 1st coordinate, it progressed to step S7 as that into which the 3rd coordinate was inputted and the right carbon button click of a mouse is performed), the data equivalent to the data notified to OS are reported to OS. In that case, the location at the time of the depression

initiation saved in step S9 as a click location (the 1st coordinate) is used. Then, OS supplies a mouse event to active application software based on this report. Application software performs processing when the 1st coordinate is right-clicked according to this mouse event.
[0036] According to this operation gestalt, when the input of the 2nd coordinate which separated exceeding the 1st coordinate to the distance W1 is in time amount deltat from the input of the 1st coordinate and there is an input of the 3rd coordinate [/ near less than W3] from the 1st coordinate after that, the data equivalent to the right carbon button click of a mouse will be reported to OS. Actuation equivalent to carrying out the right carbon button click of the icon with a mouse easily can be performed only by carrying out the tap of another location by the middle finger by this, touching the icon of the request on a screen by the index finger.
[0037] In addition, although the touch panel 3 in this operation gestalt is a pressure-sensitive-type touch panel in which the coordinate input of only one point is possible to coincidence, if it adds processing in which those input coordinates are changed into the coordinate of one point of those middle points or a center of gravity when coincidence has the coordinate input of two or more points, it can also use for coincidence the thing in which a coordinate input is possible about two or more points as a touch panel 3.
[0038] Drawing 5 is a flow chart which shows another example of the procedure by the device driver 32. The contents of processing in steps S51-S58 are the same as step S1 of drawing 4 - S4, S7 - S9, and the contents of processing in S11 respectively. That is, processing of drawing 5 is what skipped steps S5, S6, and S10 in processing of drawing 4 . Therefore, in processing of drawing 4 , the input of the 2nd coordinate is detected in step S4. As opposed to being made to perform the report to OS of step S7 again by making to perform detection (input of the 3rd coordinate) of the location near [at the time of depression initiation] the depression location into requirements, after setting a flag 2 In processing of drawing 5 , when the input of the 2nd coordinate is detected in step S54, it will progress to step S55 immediately, and the data equivalent to a right carbon button click will be reported to OS. Also by this, the effectiveness acquired by the procedure of drawing 4 and the same effectiveness can be acquired.
[0039] In the procedure of drawing 5 , continuation of a depression is made the requirements for reporting step S55 by processing of step S52. however, this requirement -- removing -- continuation of the depression from the input point in time of the 1st coordinate -- when the input of the 2nd coordinate is after the input of the 1st coordinate, and within deltat irrespective of how, it may be made to report step S55. According to this, after the input of the 1st coordinate, since the 2nd coordinate can be inputted without continuing the depression, an input becomes easier.
[0040] in addition, an above-mentioned operation gestalt -- setting -- **** -- although the thing of a pressure-sensitive type is used as a touch panel 3, the touch panel of the thing of other methods, for example, a digital (matrix) method, an optical (infrared radiation) scanning mode, a capacity-coupling method, and a surface-acoustic-waves method may instead be used.
[0041] The touch panel of a digital (matrix) method is arranged and equipped with two or more band-like transparent electrodes 61 and two or more band-like transparent electrodes 62 in the direction of X, and the direction of Y, respectively, as shown in drawing 6 . If each transparent electrodes 61 and 62 have countered through an opening and have a depression, one of the transparent electrodes 61 and transparent electrodes 62 corresponding to the location will flow through them. A depression location is detectable by investigating which transparent electrodes 61 and 62 each transparent electrodes 61 and 62 were scanned in order, and have flowed. The resolution of a depression point is lower than the case of a pressure-sensitive type depending on the number of transparent electrodes 61 and 62. Although a theory top can detect two or more depression locations to coincidence, it depends for the number of locations detectable to coincidence on the specification of the controller to adopt. The calibration is unnecessary.
[0042] The touch panel of an optical (infrared radiation) scanning mode is arranged and equipped with the pair of many photogenic organs 71 and an electric eye 72 in the direction of X, and the direction of Y, as shown in drawing 7 . When the light which a photogenic organ 71 emits detects the location interrupted with a finger or a pen by the electric eye 72, a depression location with a finger or a pen is detected and outputted. The resolution of a depression point is lower than the case of a pressure-

sensitive type depending on the number of a photogenic organ 71 and electric eyes 72. Although a theory top can detect two or more depression locations to coincidence, only the location usually pushed first is detected. It is dependent on the specification of the controller to adopt to what point it detects to coincidence. Even if the calibration is unnecessary and a blemish sticks on the surface of a panel, it is uninfluential in actuation.

[0043] The touch panel of a capacity-coupling method forms the electric conduction film in a panel front face, and has the structure which has arranged the electrode around. If uniform electric field are formed in the electric conduction film from the surrounding electrode and a finger and an exclusive pen will contact a panel front face, a current will flow and electric field will be confused. Based on this current, a contact location is computable. Although this touch panel has the high transparency of a panel and resolution is also high, when two points are pushed on coincidence, those middle points are recognized as a depression point. Since it is not necessary to make an electrode etc. transform and to make it contact [according to this method] unlike a pressure-sensitive type or a digital type in order to make a depression point recognize, a depression point can be made to recognize only by there being little force which carries out the depression of the panel, and touching slightly. However, in order to pass a current on a front face, to use a pen, it is necessary to use the thing of dedication. Moreover, to push with a finger, it is necessary to carry out empty-handed.

[0044] The touch panel of a surface-acoustic-waves method is equipped with the reflective array 83 which reflects the supersonic wave which the dispatch child 81 of a supersonic wave (surface acoustic waves) and the receiving child 82, and the dispatch child 81 emit, and the reflective array 84 which turns to the receiving child 82 the supersonic wave which the reflective array 83 reflected, and is reflected in a list as shown in drawing 8 . Although the component for detecting the depression location of the direction of X by a diagram is shown, the component for detecting the depression location of the direction of Y which rotated the same configuration 90 degrees also exists. After being reflected in the direction of Y, or the direction of X by the reflective array 83, and the supersonic wave which the dispatch child 81 sends progressing along a panel front face by it and being further reflected by the reflective array 84, it is received by the receiving child 82, but since the distance of the route to transmit differs according to the reflective location by the reflective arrays 83 and 84, the receiving child 82 is reached with the width of face which exists in time. In order that a supersonic wave may progress the whole panel front face uniformly in the condition that there is no depression, at this time, the reinforcement of the supersonic wave which carries out incidence to the receiving child 82 becomes fixed in time. However, if a depression point with a pen or a finger is in the middle, in order that transfer of the supersonic wave passing through the location may be overdue, the receiving reinforcement in the time of day equivalent to the location becomes low. Therefore, the controller of a touch panel can compute the coordinate of a depression location based on the time of day when receiving reinforcement became low. This touch panel has the high transparency of a panel, and its resolution of an input coordinate is also high. It is also possible to input the coordinate of two or more points into coincidence. However, only the coordinate input of the location pushed first is usually accepted. It depends on the specification [what point can be inputted into coincidence] of a controller. To use a pen, it is necessary to use the thing of high dedication of the absorption coefficient of a supersonic wave.

[0045] If the description about the all directions type of the touch panel mentioned above is summarized, it will become as it is shown in the table of drawing 9 .

[Translation done.]

* NOTICES *

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1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram showing the configuration of the information processor concerning 1 operation gestalt of this invention.
[Drawing 2] It is an explanatory view for explaining the principle of the touch panel in the equipment of drawing 1 .
[Drawing 3] It is drawing showing the information flow in the equipment of drawing 1 .
[Drawing 4] It is the flow chart which shows the procedure by device DORABA in the equipment of drawing 1 .
[Drawing 5] It is the flow chart which shows another example of the procedure by device DORABA in the equipment of drawing 1 .
[Drawing 6] It is drawing for explaining the principle of the touch panel of a digital (matrix) method.
[Drawing 7] It is drawing for explaining the principle of the touch panel of an optical (infrared radiation) scanning mode.
[Drawing 8] It is drawing for explaining the principle of the touch panel of a surface-acoustic-waves method.
[Drawing 9] It is drawing of the table showing collectively the description about the all directions-type touch panel which can be used by this invention.
[Description of Notations]
The digitizer section, the body of 2:personal computer, 3 : 1: A touch panel, 4 : An AD converter, 5, 6:interface circuitry, 7:CPU, 8 : A bus, 21, 22:transparent electrode, 21a, the direction edge of 21 b:X, 22a, the direction edge of 22 b:Y, 32: -- a device driver, 33:OS, 34:application software, 61:transparent electrode, 62:transparent electrode, and 71: -- a photogenic organ, 72:electric eye, 81:dispatch child, a 82:receiving child, 83, and a 84:reflective array.

[Translation done.]

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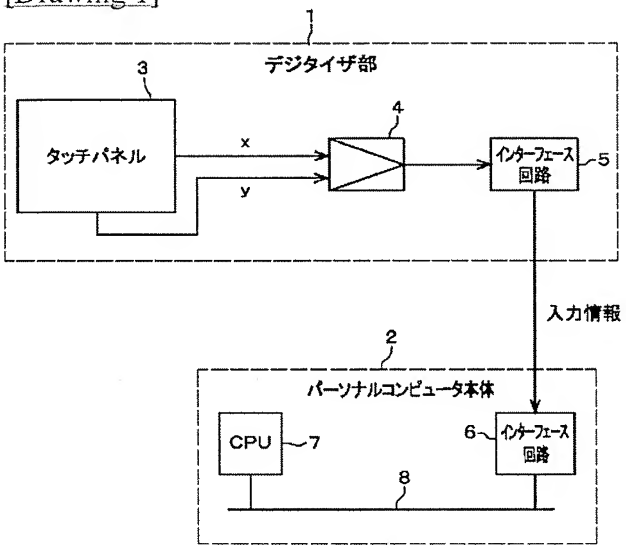
damages caused by the use of this translation.

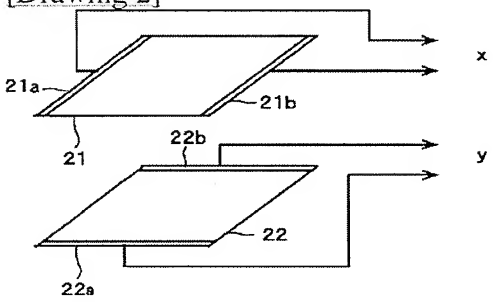
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

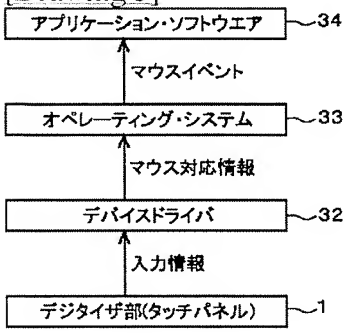
[Drawing 1]



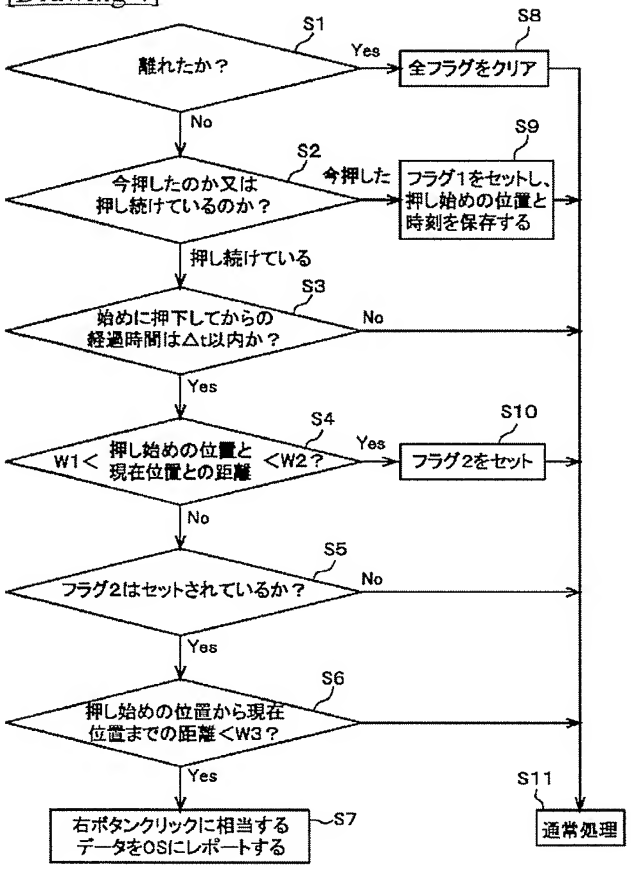
[Drawing 2]



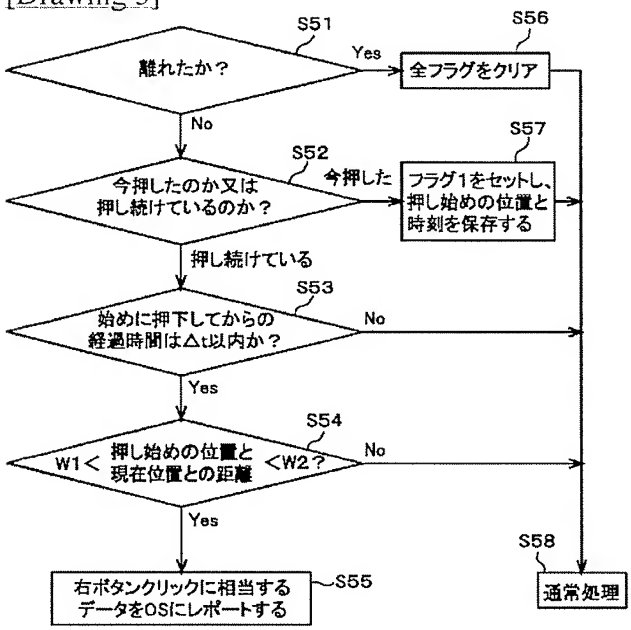
[Drawing 3]



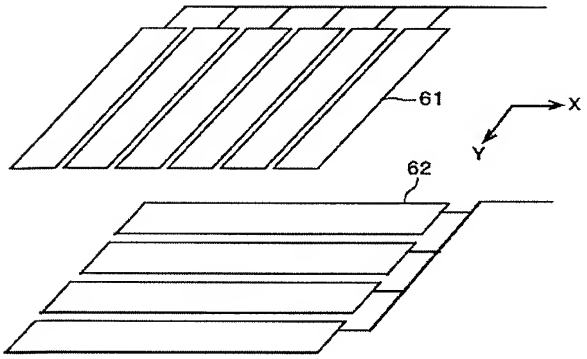
[Drawing 4]



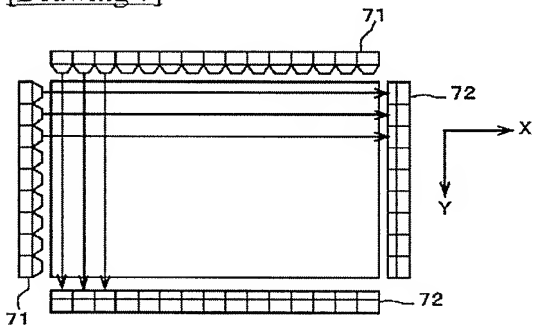
[Drawing 5]



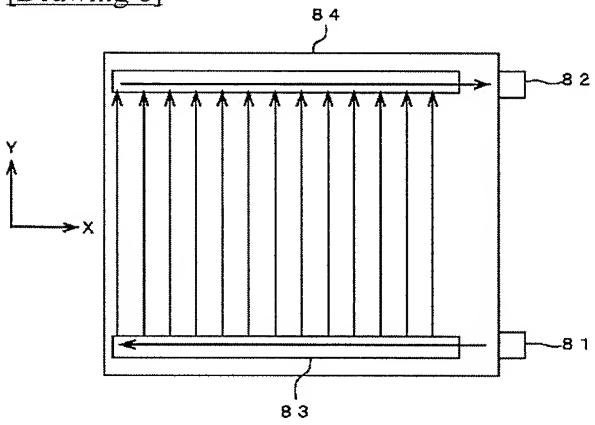
[Drawing 6]



[Drawing 7]



[Drawing 8]



[Drawing 9]

方式	複数点押下時の入力座標	解像度	その他の特徴
マトリックス	コントローラに依存	低	キャリブレーション不要、傷に強い
光走査	コントローラに依存	低	キャリブレーション不要、傷に強い
容量結合	中点	高	触れるだけ、要専用ペン、傷に強い
弾性表面波	コントローラに依存	高	触れるだけ、要専用ペン、傷に強い

[Translation done.]

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	3/033	３４０	3/033	３４０Ｅ	５Ｂ０８７

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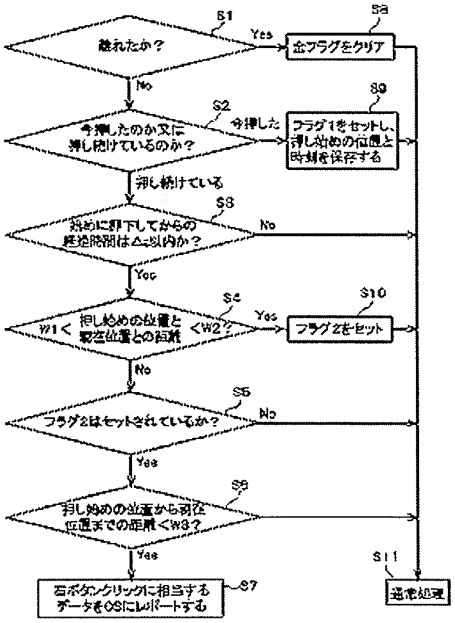
最終頁に続く

(54)【発明の名称】　情報処理装置、プログラム及び座標入力方法

(57)【要約】
【課題】　同時には１点についての座標入力しか行えない座標入力手段を用いる場合でも、入力座標についての異なる操作を事前の設定変更の必要なく容易に切り替えて行うことができる技術を提供する。
【解決手段】　第１座標の入力があった後に、第１座標から所定距離以上離れた第２座標の入力が所定時間内あったか否かを判定し（ステップＳ２～Ｓ４、Ｓ９）、又は第１座標の入力があった後に、第１座標から所定距離以上離れた第２座標の入力、及びその後の、第１座標の所定の近傍における第３座標の入力が所定時間内にあったかを判定し（ステップＳ２～Ｓ６、Ｓ９、Ｓ１０）、その判定結果に応じて、第１座標に基づく第１の処理（ステップＳ１１）又は第１座標に基づく第２の処理（ステップＳ７）を行うようにする。



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【特許請求の範囲】

【請求項１】　任意の第１座標の入力があった後．所定の時間内に、前記第１座標から所定距離以上離れた第２の座標の入力があったか否かの判定を行う手段と．

前記判定が否定的であった場合に、前記第１座標に基づく第１の処理を行う手段と．

前記判定が肯定的であった場合に、前記第１処理とは異なる．前記第１座標に基づく第２の処理を行う手段とを具備することを特徴とする情報処理装置。

【請求項２】　前記情報処理装置はコンピュータを備え．前記第１処理は、前記第１座標にカーソルを位置付けてマウスの左ボタンクリックが行われた場合に前記コンピュータのオペレーティングシステムに通知される情報と同様の情報を前記オペレーティングシステムに通知する処理を含み．前記第２処理は、前記第１座標にカーソルを位置付けてマウスの右ボタンクリックが行われた場合に前記オペレーティングシステムに通知される情報と同様の情報を前記オペレーティングシステムに通知する処理を含むことを特徴とする請求項１に記載の情報処理装置。

【請求項３】　任意の第１座標の入力があった後に、前記第１座標から所定距離以上離れた第２の座標の入力、及びその後の．前記第１座標の所定の近傍における第３の座標の入力が所定時間内にあったか否かの判定を行う手段と、

前記判定が否定的であった場合に、前記第１座標に基づく第１の処理を行う手段と．

前記判定が肯定的であった場合に、前記第１処理とは異なる．前記第１座標に基づく第２の処理を行う手段とを具備することを特徴とする情報処理装置。

【請求項４】　前記情報処理装置はコンピュータを備え．前記第１処理は、前記第１座標にカーソルを位置付けてマウスの左ボタンクリックが行われた場合に前記コンピュータのオペレーティングシステムに通知される情報と同様の情報を前記オペレーティングシステムに通知する処理を含み．前記第２処理は、前記第１座標にカーソルを位置付けてマウスの右ボタンクリックが行われた場合に前記オペレーティングシステムに通知される情報と同様の情報を前記オペレーティングシステムに通知する処理を含むことを特徴とする請求項３に記載の情報処理装置。

【請求項５】　各座標の入力は、押下位置に対応させて座標入力を行うことが可能で、かつ同時には１点のみについての座標入力が可能な座標入力手段により行われることを特徴とする請求項３に記載の情報処理装置。

【請求項６】　前記座標入力手段は．押下がなされているか否か及び押下により入力される座標に関する入力情報を．押下が開始されてから解除されるまで、所定の周期で情報処理装置に与えるものであり．前記判定手段は．前記入力情報に基づき．前記第１座標の入力時点から前記第３座標の入力があるまで継続して押下がなされていると判断できることをさらなる条件として前記肯定的判定を行うものであることを特徴とする請求項５に記載の情報処理装置。

【請求項７】　前記第３座標の入力は．前記第１座標の入力のための押下が継続していることにより行われるものであることを特徴とする請求項３に記載の情報処理装置。

【請求項８】　任意の第１座標の入力があった後．所定の時間内に、前記第１座標から所定距離以上離れた第２の座標の入力があったか否かの判定を行う手段．

前記判定が否定的であった場合に、前記第１座標に基づく第１の処理を行う手段．及び前記判定が肯定的であった場合に、前記第１処理とは異なる．前記第１座標に基づく第２の処理を行う手段としてコンピュータを機能させることを特徴とするプログラム。

【請求項９】　前記第１処理は、前記第１座標にカーソルを位置付けてマウスの左ボタンクリックが行われた場合に前記コンピュータのオペレーティングシステムに通知される情報と同様の情報を前記オペレーティングシステムに通知する処理を含み．前記第２処理は、前記第１座標にカーソルを位置付けてマウスの右ボタンクリックが行われた場合に前記オペレーティングシステムに通知される情報と同様の情報を前記オペレーティングシステムに通知する処理を含むことを特徴とする請求項８に記載のプログラム。

【請求項１０】　任意の第１座標の入力があった後に、前記第１座標から所定距離以上離れた第２の座標の入力．及びその後の、前記第１座標の所定の近傍における第３の座標の入力が所定時間内にあったか否かの判定を行う手段、

前記判定が否定的であった場合に、前記第１座標に基づく第１の処理を行う手段．及び前記判定が肯定的判定であった場合に．前記第１処理とは異なる、前記第１座標に基づく第２の処理を行う手段としてコンピュータを機能させることを特徴とするプログラム。

【請求項１１】　前記第１処理は、前記第１座標にカーソルを位置付けてマウスの左ボタンクリックが行われた場合に前記コンピュータのオペレーティングシステムに通知される情報と同様の情報を前記オペレーティングシステムに通知する処理を含み、前記第２処理は．前記第１座標にカーソルを位置付けてマウスの右ボタンクリックが行われた場合に前記オペレーティングシステムに通知される情報と同様の情報を前記オペレーティングシステムに通知する処理を含むことを特徴とする請求項１０に記載のプログラム。

【請求項１２】　各座標の入力は、押下位置に対応させて座標入力を行うことが可能で、かつ同時には１点のみについての座標入力が可能な座標入力手段により行われることを特徴とする請求項１０に記載のプログラム。

【請求項１３】　前記座標入力手段は、押下がなされているか否か及び押下により入力される座標に関する入力情報を、押下が開始されてから解除されるまで、所定の周期で前記コンピュータに与えるものであり、前記判定手段は、前記入力情報に基づき、前記第１座標の入力時点から前記第３座標の入力があるまで継続して押下がなされていると判断できることをさらなる条件として前記肯定的判定を行うものであることを特徴とする請求項１２に記載のプログラム。

【請求項１４】　前記第３座標の入力は、前記第１座標の入力のための押下が継続していることにより行われるものであることを特徴とする請求項１０に記載の情報処理装置。

【請求項１５】　任意の第１の座標に基づく第１の処理を情報処理装置に実行させるために、前記第１座標の入力を、押下位置に対応させて座標入力を行うことができる座標入力手段を用いて行う第１工程と、

前記第１処理とは異なる第２の処理を任意の第１の座標に基づいて前記情報処理装置に実行させるために、その第１座標の入力、及びその後の所定時間内におけるその第１座標から所定距離以上離れた第２の座標の入力を、前記座標入力手段を用いて行う第２工程とを具備することを特徴とする座標入力方法。

【請求項１６】　前記第１座標及び第２座標の入力を、それぞれ異なる２本の指で行うことを特徴とする請求項１５に記載の座標入力方法。

【請求項１７】　任意の第１の座標に基づく第１の処理を情報処理装置に実行させるために、前記第１座標の入力を、押下位置に対応させて座標入力を行うことができる座標入力手段を用いて入力する第１工程と、

前記第１処理とは異なる第２の処理を任意の第１の座標に基づいて前記情報処理装置に実行させるために、その第１座標、そこから所定距離以上離れた第２の座標、及びその第１座標の所定の近傍における第３の座標の入力を、この順序で所定時間内に前記座標入力手段を用いて行う第２工程とを具備することを特徴とする座標入力方法。

【請求項１８】　前記座標入力手段は、押下がなされているか否か及び押下により入力される座標に関する入力情報を所定の周期で前記情報処理装置に与えるものであり、前記第１～第３座標の入力は、第１の指による押下によって前記第１座標を入力し、その押下を継続しながら別の第２の指による押下によって前記第２座標を入力し、その後、前記第２の指を離すことにより、押下が継続されている前記第１の指によって前記第３座標を入力することにより行うことを特徴とする請求項１７に記載の座標入力方法。

【請求項１９】　前記座標入力手段は、同時には１点のみについての座標入力が可能なものであることを特徴とする請求項１７に記載の座標入力方法。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、入力座標に基づく処理を行う情報処理装置、入力座標に基づく処理を行うようにコンピュータを機能させるためのプログラム、及び情報処理装置に対して入力座標に基づく処理を行わせるために座標を入力する方法に関する。

【０００２】

【従来の技術】一般に、タッチパネルを備えるパソコン等において、タッチパネルに対するタップ操作は、マウスの左ボタンクリックと同じ操作として扱われる。このため、オブジェクトの選択、プログラムの実行等は、タッチパネルをタップするだけで簡単に行うことができる。しかし、従来、マウスの右ボタンクリックを行ったときに行われる処理と同様の処理をタッチパネルの操作によって行わせたい場合には、事前にタップ操作が右ボタンクリックとして扱われるように設定変更する必要がある。またその後に、左ボタンクリックを行ったときに行われる処理と同様の処理を行わせたい場合には、再度、タップ操作が左ボタンクリックとして扱われるように設定変更する必要がある。すなわち、タップ操作により、マウスの左ボタンクリックに対応する処理と右ボタンクリックに対応する処理とを適宜切り替えて行わせるためには、その都度、設定変更を行うことが必要とされる。

【０００３】そこで、かかる処理の切替えを、設定変更の必要なく行うことができるようにするため、特開２０００－１８１６３０号公報では、タッチパネル上の第１の座標位置の位置指示を継続しつつ、別の第２の座標位置の位置指示が行われた場合に、マウスの右ボタンクリックに対応する処理を行うようにしたタッチパネルシステムが提案されている。ここで、位置指示とは、単にその位置を押下していることのみを意味するものではなく、その位置の座標が入力され、検出されることを意味している。したがって、同公報が提案する技術においては、第１の座標位置の入力と第２の座標位置の入力とが同時に行われ、検出されることが、右ボタンクリックに対応する処理を行うための要件とされている。

【０００４】

【発明が解決しようとする課題】しかしながら、この従来技術によれば、第１及び第２座標位置の同時入力があることを右ボタンクリックに対応する処理を行うための要件としているため、右ボタンクリックに対応する処理を行わせるためには、座標入力に使用するタッチパネルとして、同時に異なる２点の入力を受け入れることができるものを使用する必要がある。したがって、同時には１点の座標しか入力することができない安価な感圧式タッチパネルを使用することはできず、同時に複数点の座標を入力することが可能な、高価な表面弾性波方式等のタッチパネルを使用しなければならない。

【０００５】本発明の目的は、かかる従来技術の問題点に鑑み、同時には１点についての座標入力しか行えない座標入力手段を用いる場合でも、入力座標に基づく異なる処理を事前の設定変更の必要なく容易に切り替えて行わせることができる技術を提供することにある。

【０００６】

【課題を解決するための手段】この目的を達成するため、本発明に係る情報処理装置は、所定の判定を行う判定手段と、前記判定が否定的であった場合に、前記第１座標に基づく第１の処理を行う手段と、前記判定が肯定的であった場合に、前記第１処理と異なる、前記第１座標に基づく第２の処理を行う手段とを具備する。そして、前記所定の判定は、任意の第１座標の入力があった後、所定の時間内に、前記第１座標から所定距離以上離れた第２の座標の入力があったか否かを判定する第１のタイプの判定か、又は、任意の第１座標の入力があった後に、前記第１座標から所定距離以上離れた第２の座標の入力及びその後の、前記第１座標の所定の近傍における第３の座標の入力が所定時間内にあったか否かを判定する第２のタイプの判定であることを特徴とする。

【０００７】ここで、情報処理装置の範疇には、たとえばデスクトップパソコン、ノートパソコン、モバイルコンピュータ、ワークステーション等の各種コンピュータが含まれる。

【０００８】第２座標は、第１座標から所定距離以上離れ、かつ所定時間内に入力されたものであることを要するが、所定距離及び所定時間の値は、他の目的のための入力との区別の容易性、入力の容易性や迅速性等を考慮して設定される。他の目的のための入力としては、たとえばドラッグを行うためにタッチパネル上をスライドさせながらタッチする入力や、一定期間内にほぼ同一位置を２度タッチすることによってマウスのダブルクリックとしての効果を与えるような入力が該当する。所定距離の値が小さすぎると、ダブルクリックやドラッグとの区別があいまいになる。所定距離が大きすぎると、タッチパネルにより人差し指と中指で入力する場合の操作がやりにくくなる。所定時間が長すぎると、迅速な入力ができなくなる。これらの点を考慮し、所定距離はたとえば１ｃｍ、所定時間はたとえば０．５～１秒に設定される。これらの設定値はユーザの好みに応じて変更できるようにしてもよい。

【０００９】第２座標は第１座標から所定距離以上離れていればよく、両座標間の距離の上限値は特に定めなくてもよい。第１座標に対する第２座標の方向も、特に限定する必要はないが、その方向に意味をもたせ、その方向に応じて、第２処理の内容を変更するようにしてもよい。

【００１０】第３座標は、第１座標の所定の近傍であることを要するが、この所定の近傍には、第１座標と同一の位置も含まれる。所定の近傍の範囲は、たとえば、ユーザが同一位置をタッチしているつもりでも、タッチ位置が微小変動することにより入力座標が変動する範囲を基準として定められる。具体的にはたとえば第１座標を中心とする半径０．５ｍｍの範囲が該当する。この設定は、ユーザの個別の事情に応じて変更できるようにしてもよい。

【００１１】第３座標は第１座標の入力から所定時間内に入力されることを要するが、この所定時間の値は、入力操作の容易性、迅速性、他の入力操作との区別の容易性等を考慮して適切に設定される。具体的には、たとえば０．５～１秒が該当する。この設定は、ユーザが所望に応じて変更できるようにしてもよい。

【００１２】各座標の入力は、たとえば、押下位置に対応させて座標入力を行うことが可能で、かつ同時には１点のみについての座標入力が可能な座標入力手段により行うことができる。このような座標入力手段として、たとえば、感圧式（抵抗膜式）や容量結合式のタッチパネルを使用することができる。

【００１３】座標入力手段は通常、押下がなされているか否か及び押下により入力される座標に関する入力情報を、押下が開始されてから解除されるまで、所定の周期で情報処理装置に与えるものである。第２タイプの判定を行う判定手段は、かかる入力情報に基づき、第１座標の入力時点から第３座標の入力があるまで継続して押下がなされていると判断できることをさらなる条件として肯定的判定を行う場合もある。

【００１４】判定手段が第１タイプの判定を行うものである場合、第１及び第２座標の入力は、たとえば、タッチパッド等のタッチ式の座標入力装置を用い、２本の指、たとえば人差し指と中指で順にタッチすることによって容易に行うことができる。この場合、きわめて容易かつ迅速に、第１座標に基づく処理として第１処理か又は第２処理を選択し、実行させることができる。

【００１５】判定手段が第２タイプの判定を行うものである場合、第１～第３座標の入力はたとえば、座標入力手段として、押下がなされているか否か及び押下により入力される座標に関する入力情報を、押下が開始されてから解除されるまで、所定の周期で情報処理装置に与えるものを用い、第１の指による押下によって第１座標を入力し、その押下を継続しながら別の第２の指による押下によって第２座標を入力し、その後、第２の指を離すことにより容易に行うことができる。このとき、押下が継続されている第１の指によって第３座標が入力されることになる。このように、第３座標の入力は、第１座標の入力のための押下が継続していることにより行われるものであってもよい。

【００１６】座標入力手段としては、同時には１点のみについての座標入力が可能な１点タイプのものに限らず、同時に複数点を押下して複数の座標を入力することができる多点タイプのものも使用することができる。そ

のためには、同時に複数点の座標入力があった場合はそれらの入力座標を、それらの中点又は重心の、１点の座標に変換するという処理を追加すればよい。いずれにしても、第３座標の入力タイミングは第２の指を離した時に一致する。多点タイプのタッチパネルとしては、たとえばデジタル（マトリクス）方式、光（赤外線）走査方式、表面弾性波方式のものを使用することができる。

【００１７】座標入力手段としては、タッチパネルのほか、タブレット、タッチパッド等を使用することもできる。これらの座標入力手段におけるタッチ位置検出方式としては、たとえば感圧式（抵抗膜式）、デジタル（マトリクス）方式、光（赤外線）走査方式、容量結合方式、表面弾性波方式を挙げることができる。

【００１８】本発明に係る情報処理装置によれば、本発明に従った第１座標及び第２座標の入力の有無に応じて、あるいはさらに第３座標の有無に応じて、第１座標に基づく第１処理と第２処理を選択的に実行するようにしているため、第１座標に基づく処理として、第１処理及び第２処理を容易に使い分けて実行させることができる。その場合、第１座標と第２座標の同時入力を、第２処理を行うための要件としていないため、同時には１点のみについての座標入力が可能な安価な座標入力手段を用いることができる。したがって、たとえば、第１座標にカーソルを位置付けてマウスの左ボタンクリックが行われた場合に情報処理装置のコンピュータのオペレーティングシステムに通知される情報と同様の情報をオペレーティングシステムに通知する処理を第１処理に含め、第１座標にカーソルを位置付けてマウスの右ボタンクリックが行われた場合にオペレーティングシステムに通知される情報と同様の情報をオペレーティングシステムに通知する処理を第２処理に含めることによって、安価な構成により、マウスの左ボタンクリック及び右ボタンクリックに対応する処理を容易に切り替えて情報処理装置に実行させることができる。なお、判定手段が第２タイプの判定を行うものである場合は、第１タイプの判定を行うものである場合に比べ、さらに第３座標の入力があったことを第２処理を実行するための要件としているので、第２処理を実行させるための入力操作をより確実に誤操作なく行うことができる。

【００１９】本発明に係るプログラムは、所定の判定を行う判定手段、前記判定が否定的であった場合に、前記第１座標に基づく第１の処理を行う手段、及び前記判定が肯定的であった場合に、前記第１処理とは異なる、前記第１座標に基づく第２の処理を行う手段としてコンピュータを機能させるものである。そして、前記所定の判定は、任意の第１座標の入力があった後、所定の時間内に、前記第１座標から所定距離以上離れた第２の座標の入力があったか否かを判定する第１のタイプの判定か、又は、任意の第１座標の入力があった後に、前記第１座標から所定距離以上離れた第２の座標の入力及びその後の、前記第１座標の所定の近傍における第３の座標の入力が所定時間内にあったか否かを判定する第２のタイプの判定であることを特徴とする。作用効果及び各構成部分についての説明は、上述の本発明に係る情報処理装置の場合と同様である。

【００２０】本発明に係る座標入力方法は、任意の第１の座標に基づく第１の処理を情報処理装置に実行させるために、前記第１座標の入力を、押下位置に対応させて座標入力を行うことができる座標入力手段を用いて行う第１工程と、前記第１処理とは異なる第２の処理を任意の第１の座標に基づいて前記情報処理装置に実行させるために、所定の座標入力を行う第２工程とを具備する。そして、前記所定の座標入力は、前記第２処理の基礎となる第１座標の入力、及びその後の所定時間内におけるその第１座標から所定距離以上離れた第２の座標の入力を、前記座標入力手段を用いて行うものであるか、又は、前記第２処理の基礎となる第１座標、そこから所定距離以上離れた第２の座標、及びその第１座標の所定の近傍における第３の座標の入力を、この順序で所定時間内に前記座標入力手段を用いて行うものであることを特徴とする。

【００２１】ここで、情報処理装置としては、上述の本発明に係る情報処理装置を使用することができる。本発明に係る座標入力方法による作用効果は上述の本発明に係る情報処理装置の場合と同様である。第２処理の基礎となる第１座標、第２座標、及び第３座標、並びに所定距離、所定時間、及び所定の近傍の内容や具体的態様も、上述の本発明に係る情報処理装置の場合と同様である。また、第２処理の基礎となる第１座標、第２座標、及び第３座標の入力方法や座標入力手段に対して適用し得る具体的態様についても、上述の本発明に係る情報処理装置の場合と同様の説明を適用することができる。

【００２２】

【発明の実施の形態】図１は、本発明の一実施形態に係る情報処理装置の構成を示すブロック図である。同図に示すように、この装置は、押下による座標入力を受け入れ、入力座標及び押下されているか否か（押下のオン又はオフ）の情報を含む入力情報を出力するデジタイザ部１、及び入力情報に基づく処理を行うパーソナルコンピュータ本体２を備える。デジタイザ部１は指やペンによって押下された点のＸ座標及びＹ座標に対応するアナログ信号（電圧値）ｘ及びｙを出力するタッチパネル３、このアナログ信号をデジタル信号に変換するＡＤコンバータ４、ＡＤコンバータ４の出力に基づき、上述の入力情報を、パーソナルコンピュータ本体２が直接取り扱うことができるＲＳ２３２やＵＳＢ等のシリアルインターフェース規格に準拠した信号に変換して出力するインターフェース回路５を備える。

【００２３】パーソナルコンピュータ本体２は、ＵＳＢコントローラ、Ｉ／Ｏコントローラ等で構成されたイン

ターフェース回路６、インターフェース回路６とＣＰＵ７を接続するバス８等を備え、インターフェース回路６を介してインターフェース回路５からの入力情報を受け入れ、入力情報に基づく適切な処理を行う。タッチパネル３は、パーソナルコンピュータ本体２のディスプレイの画面上に重ねて設けられており、タッチパネル３を介して画面をタッチすることにより、画面表示に対応した座標が入力できるようになっている。

【００２４】図２はタッチパネル３の原理を説明するための説明図である。タッチパネル３は、同図に示すように、２枚の透明電極（抵抗膜）２１及び２２を備えた、感圧式（抵抗膜式）のタッチパネルである。透明電極２１及び２２間は空隙を介して対向しており、押下のないときは導通していないが、指やペンで透明電極２１が押下されると、押下点において透明電極２１は透明電極２２に接続し、両電極間が導通状態となる。このとき、透明電極２１のＸ方向端部２１ａ及び２１ｂ間に一定の電圧を印加することにより、透明電極２２のＹ方向端部２２ａ及び２２ｂ間に生じる電圧を、Ｙ方向における押下位置に対応する信号ｙとして出力することができる。また、透明電極２２のＹ方向端部２２ａ及び２２ｂ間に一定の電圧を印加することによって、透明電極２１のＸ方向端部２１ａ及び２１ｂ間に生じる電圧を、Ｘ方向における押下位置に対応する信号ｘとして出力することができる。

【００２５】２点が同時に押下されたときは、各点が別個に押下された場合にそれぞれ生じる電圧の中間の電圧がＸ方向端部２１ａ及び２１ｂ並びにＹ方向端部２２ａ及び２２ｂに生じるため、押下された２点の中点に対応するレベルのものとして、信号ｘ及びｙが出力される。したがって、２点を同時に押下しても、各点の座標を入力することはできず、中点の１点のみが入力される。しかしながら、出力される信号ｘ及びｙは押下位置に対応して連続的に変化するアナログ量であるため、押下位置についての解像度は高い。

【００２６】デジタイザ部１は、このようにして得られるタッチパネル３からの入力座標に関する情報、及びタッチパネル３が押下されている（オン）か否か（オフ）に関する情報を含む入力情報を、押下開始時から押下が解除される時点まで、パーソナルコンピュータ本体２へ出力する。パーソナルコンピュータ本体２は、順次入力される入力情報に基づき、現在の押下状態及び入力座標を知ることができる。

【００２７】パーソナルコンピュータ本体２のＯＳ（オペレーティングシステム）には、デジタイザ部１との間のアクセスを可能にするためのデバイスドライバが組み込まれている。図３に示すように、デジタイザ部１からの入力情報はデバイスドライバ３２によりマウスの操作に対応する情報に変換され、ＯＳ３３に渡される。ＯＳ３３はこの情報に基づき、マウスカーソルの移動やクリックを示すマウスイベントをアプリケーションソフトウェア３４に渡す。

【００２８】図４はデバイスドライバによる処理手順を示すフローチャートである。タッチパネル３が指で押下されている間は、指が離れるまで、デジタイザ部１のコントローラは所定の周期で入力情報を送ってくるので、その都度割り込みによって、デバイスドライバは図４の処理を実行する。タッチパネル３が指で押下されていないときは図４の処理は行われない。

【００２９】すなわちまず、ステップＳ１において、タッチパネル３から指が離れたか否かを判定する。入力情報において押下がオフである場合は指が離れたと判定する。指が離れたと判定した場合は、ステップＳ８においてフラグ１及び２をリセットし、ステップＳ１１へ進んで、通常の処理を行う。この場合の通常処理としてはたとえば、後述のステップＳ９で以前に保存された押し始めの入力座標（以下、「第１座標」ともいう。）がマウスで左クリックされた場合にＯＳに通知されるデータと同様のデータをＯＳに通知する処理が含まれる。

【００３０】ステップＳ１において指が離れていないと判定した場合は、ステップＳ２へ進み、今押されたのか又は押し続けられているのかを判定する。すなわち、押下が継続されていることを示すフラグ１がオフで、かつ押下がオンであれば今押されたと判定し、フラグ１がオンで、かつ押下がオンであれば押し続けられていると判定する。今押されたと判定した場合はステップＳ９において、フラグ１をセットするとともに、入力情報により示される入力座標（第１座標）を押し始めの位置として、現在の時刻とともに保存し、その後、ステップＳ１１へ進んで通常の処理を行う。この場合の通常処理としては、たとえば入力情報が示す入力座標へカーソルを移動させるためのデータをＯＳに通知する処理が含まれる。

【００３１】ステップＳ２において、押し続けられていると判定した場合はステップＳ３へ進み、押下が開始されてからの経過時間がΔｔ以内であるか否かを判定する。経過時間は、その押下の開始時にステップＳ９で保存した時刻と現在の時刻とに基づいて得ることができる。経過時間がΔｔ以内でないと判定した場合はステップＳ１１へ進み、通常の処理を行う。この場合の通常処理としては、たとえば、入力情報が示す入力座標へカーソルを移動させるためのデータをＯＳに通知する処理が該当する。また、Δｔとしては、たとえば、０．５～１秒が設定される。

【００３２】ステップＳ３において経過時間がΔｔ以内であると判定した場合は、ステップＳ４へ進み、押下開始時にステップＳ９で保存した押下開始時の位置（第１座標）と現在位置（入力座標）との距離がＷ１より大きくかつＷ２より小さいか否かを判定する。この距離がＷ１より大きくかつＷ２より小さいと判定した場合は、ス

テップＳ１０においてフラグ２をセットし、その後、ステップＳ１１へ進んで通常の処理を行う。つまりフラグ２がオンであることは、第１座標の入力があったときから押下が継続しており、かつ第１座標の入力から時間Δｔ以内に、第１座標からＷ１以上離れた座標が新たに入力されたことを示す。ただし、この新たな入力座標（以下、「第２座標」という。）は第１座標と押下位置との中点の座標となる。この場合のステップＳ１１における通常処理としては、たとえば第２座標へカーソルを移動させるためのデータをＯＳに通知する処理が該当する。Ｗ１の値としては、たとえば１ｃｍが該当する。Ｗ２による制限は行わなくてもよい。

【００３３】ステップＳ４において押下開始時の位置と現在位置との距離が「Ｗ１より大きくかつＷ２より小さい」ことはないと判定した場合は、ステップＳ５へ進み、フラグ２がセットされているか否かを判定する。この時点でフラグ２がオンであるということは、第１座標における押下が継続しており、かつその押下開始時から時間Δｔ以内にＷ１以上離れた第２座標に対応する位置が押下され、その後、その押下が解除されたことを意味する。フラグ２がセットされていないと判定した場合はステップＳ１１へ進み、通常の処理を行う。この場合の通常処理としては、たとえば入力情報が示す入力座標へカーソルを移動させるためのデータをＯＳに通知する処理が含まれる。

【００３４】ステップＳ５においてフラグ２がセットされていると判定した場合はステップＳ６へ進み、ステップＳ９で保存された押下開始時の位置と現在位置との距離がＷ３より小さいか否かを判定する。Ｗ３の値は、たとえば０．５ｍｍに設定される。Ｗ３より小さくないと判定した場合はステップＳ１１へ進み、通常の処理を行う。この場合の通常処理としては、たとえば入力情報が示す入力座標へカーソルを移動させるためのデータをＯＳに通知する処理が該当する。

【００３５】ステップＳ６において押下開始時の位置と現在位置との距離がＷ３より小さいと判定した場合、すなわち入力情報が示す入力座標が第１座標から半径Ｗ３以内の近傍にあれば、第３の座標が入力されたものとしてステップＳ７へ進み、マウスの右ボタンクリックが行われた場合にＯＳに通知されるデータに相当するデータをＯＳにレポートする。その場合、クリック位置としては、ステップＳ９において保存された押下開始時の位置（第１座標）が用いられる。この後、ＯＳはこのレポートに基づき、アクティブなアプリケーションソフトウェアに対し、マウスイベントを供給する。アプリケーションソフトウェアは、このマウスイベントに応じ、第１座標が右クリックされた場合の処理を行う。

【００３６】本実施形態によれば、第１座標の入力から時間Δｔ内に第１座標から距離Ｗ１を超えて離れた第２座標の入力があり、かつその後に、第１座標からＷ３以内の近傍における第３座標の入力があった場合にマウスの右ボタンクリックに相当するデータをＯＳにレポートすることになる。これにより、たとえば人差し指で画面上の所望のアイコンをタッチしながら中指で別の位置をタップするだけで、容易にそのアイコンをマウスで右ボタンクリックすることに相当する操作を行うことができる。

【００３７】なお、本実施形態におけるタッチパネル３は、同時には１点のみの座標入力が可能な感圧式のタッチパネルであるが、同時に複数点の座標入力があった場合はそれらの入力座標を、それらの中点又は重心の、１点の座標に変換するという処理を追加すれば、タッチパネル３として、複数点について同時に座標入力が可能なものを用いることもできる。

【００３８】図５はデバイスドライバ３２による処理手順の別の例を示すフローチャートである。ステップＳ５１～Ｓ５８における処理内容はそれぞれ、図４のステップＳ１～Ｓ４、Ｓ７～Ｓ９及びＳ１１における処理内容と同様である。すなわち、図５の処理は、図４の処理におけるステップＳ５、Ｓ６及びＳ１０を省略したものとなっている。したがって、図４の処理では、ステップＳ４において第２座標の入力を検出し、フラグ２をセットした後、再度、押下開始時における押下位置近傍の位置の検出（第３座標の入力）が行われることを要件としてステップＳ７のＯＳへのレポートを行うようにしているのに対し、図５の処理では、ステップＳ５４において第２座標の入力が検出された場合、直ちにステップＳ５５へ進み、右ボタンクリックに相当するデータをＯＳへレポートすることになる。これによっても、図４の処理手順により得られる効果と同様の効果を得ることができる。

【００３９】図５の処理手順では、ステップＳ５２の処理により、押下の継続が、ステップＳ５５のレポートを行うための要件とされる。しかし、この要件を外し、第１座標の入力時点からの押下の継続如何に拘らず、第１座標の入力後、Δｔ以内に第２座標の入力があった場合に、ステップＳ５５のレポートを行うようにしてもよい。これによれば、第１座標の入力後、その押下を継続することなく第２座標の入力を行うことができるため、入力がより簡単になる。

【００４０】なお、上述の実施形態においてはタッチパネル３として感圧式のものを用いているが、この代わりに、他の方式のもの、たとえばデジタル（マトリクス）方式、光（赤外線）走査方式、容量結合方式、表面弾性波方式のタッチパネルを用いてもよい。

【００４１】デジタル（マトリックス）方式のタッチパネルは、図６に示すように、複数の帯状の透明電極６１及び複数の帯状の透明電極６２をそれぞれＸ方向及びＹ方向に配列して備える。各透明電極６１及び６２は空隙を介して対向しており、押下があると、その位置に対応

するいずれかの透明導極６１と透明電極６２とが導通するようになっている。各透明導極６１及び６２を順にスキャンしてどの透明導極６１と６２が導通しているかを調べることにより押下位置を検出することができる。押下点の解像度は透明導極６１及び６２の本数に依存し、感圧式の場合よりも低い。理論上は複数の押下位置を同時に検出することが可能であるが、同時に検出できる位置の数は、採用するコントローラの仕様に依存する。キャリブレーションは不要である。

【００４２】光（赤外線）走査方式のタッチパネルは、図７に示すように、多数の発光器７１及び受光器７２の対をＸ方向及びＹ方向に配列して備える。発光器７１の発する光が指やペンで遮られる位置を受光器７２で検知することにより、指やペンによる押下位置を検出し、出力するものである。押下点の解像度は発光器７１及び受光器７２の数に依存し、感圧式の場合よりも低い。理論上は複数の押下位置を同時に検出することが可能であるが、通常は最初に押下された位置のみを検出する。同時に何点まで検出するかは、採用するコントローラの仕様に依存する。キャリブレーションは不要であり、パネルの表面に傷がついても動作に影響はない。

【００４３】容量結合方式のタッチパネルは、パネル表面に導電膜を形成し、周囲に電極を配置した構造を有する。周囲の電極から導電膜に一様な電界を形成しておけば、指や専用ペンがパネル表面に接触すると、電流が流れ、電界が乱れる。この電流に基づいて接触位置を算出することができる。このタッチパネルは、パネルの透明度が高く、解像度も高いが、２点が同時に押下された場合は、それらの中点を押下点として認識する。この方式によれば、感圧式やデジタル式と異なり、押下点を認識させるために電極等を変形させて接触させる必要がないので、パネルを押下する力は少なくてよく、わずかに触れるだけで押下点を認識させることができる。ただし、表面に電流を流すため、ペンを使用する場合は専用のものを用いる必要がある。また、指で押す場合は、素手で行う必要がある。

【００４４】表面弾性波方式のタッチパネルは、図８に示すように、超音波（表面弾性波）の発信子８１及び受信子８２、発信子８１が発する超音波を反射する反射アレイ８３、並びに反射アレイ８３が反射した超音波を受信子８２へ向けて反射する反射アレイ８４を備える。図ではＸ方向の押下位置を検出するための構成部分を示しているが、同様の構成を９０度回転させたＹ方向の押下位置を検出するための構成部分も存在する。発信子８１が発信する超音波は、反射アレイ８３によってＹ方向又はＸ方向に反射され、パネル表面に沿って進み、さらに反射アレイ８４によって反射されてから受信子８２により受信されるが、反射アレイ８３及び８４による反射位置に応じて、伝達する道筋の距離が異なるため、時間的にある幅をもって受信子８２に到着する。このとき、押下がない状態では、超音波はパネル表面全体を一様に進むため、受信子８２に入射する超音波の強度は時間的に一定となる。しかし途中にペンや指による押下点があると、その位置を通る超音波の伝達が遅れるため、その位置に相当する時刻における受信強度は低くなる。したがって、タッチパネルのコントローラは、受信強度が低くなった時刻に基づいて、押下位置の座標を算出することができる。このタッチパネルは、パネルの透明度が高く、入力座標の解像度も高い。同時に複数点の座標の入力を行うことも可能である。しかし、通常は、最初に押下された位置の座標入力のみを受け入れる。何点までを同時に入力できるかはコントローラの仕様による。ペンを使用する場合は、超音波の吸収率の高い専用のものを使用する必要がある。

【００４５】上述したタッチパネルの各方式についての特徴をまとめれば、図９の表のようになる。

【００４６】

【発明の効果】以上説明したように本発明によれば、第１座標の入力後、所定時間内における所定距離以上離れた第２座標の入力、あるいはさらにその後の第１座標近傍における第３座標の入力の有無に応じて第１座標に基づく第１の処理又は第２の処理を選択的に行うようにしたため、同時には１点についての座標入力しか行えない座標入力手段を用いる場合でも、第１処理及び第２処理を容易に選択して実行させることができる。

【図面の簡単な説明】

【図１】本発明の一実施形態に係る情報処理装置の構成を示すブロック図である。

【図２】図１の装置におけるタッチパネルの原理を説明するための説明図である。

【図３】図１の装置における情報の流れを示す図である。

【図４】図１の装置におけるデバイスドライバによる処理手順を示すフローチャートである。

【図５】図１の装置におけるデバイスドライバによる処理手順の別の例を示すフローチャートである。

【図６】デジタル（マトリックス）方式のタッチパネルの原理を説明するための図である。

【図７】光（赤外線）走査方式のタッチパネルの原理を説明するための図である。

【図８】表面弾性波方式のタッチパネルの原理を説明するための図である。

【図９】本発明で使用しうる各方式のタッチパネルについての特徴をまとめて示す表の図である。

【符号の説明】

１：デジタイザ部、２：パーソナルコンピュータ本体、３：タッチパネル、４：ＡＤコンバータ、５、６：インターフェース回路、７：ＣＰＵ、８：バス、２１、２２：透明導極、２１ａ，２１ｂ：Ｘ方向端部、２２ａ，２２ｂ：Ｙ方向端部、３２：デバイスドライバ、３３：

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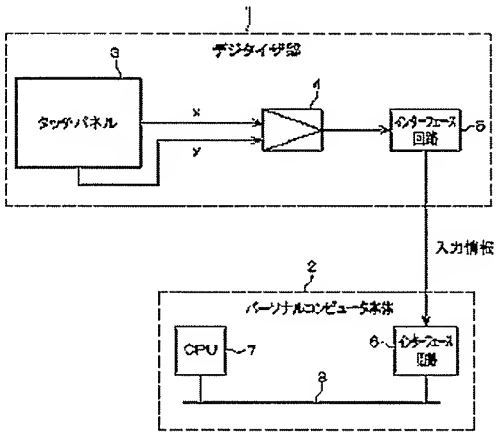
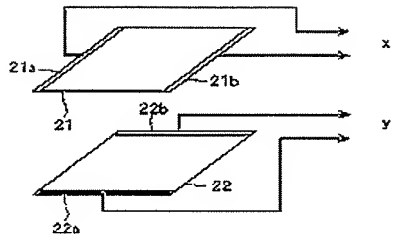
ＯＳ．３４：アプリケーションソフトウェア、６１：透　＊器．８１：発信子、８２：受信子、８３，８４：反射ア明電極、６２：透明電極．７１：発光器、７２：受光　＊　レイ。

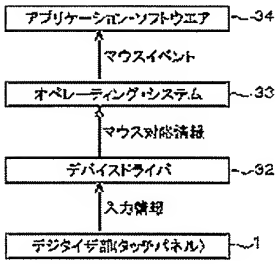
【図１】



【図２】



【図３】



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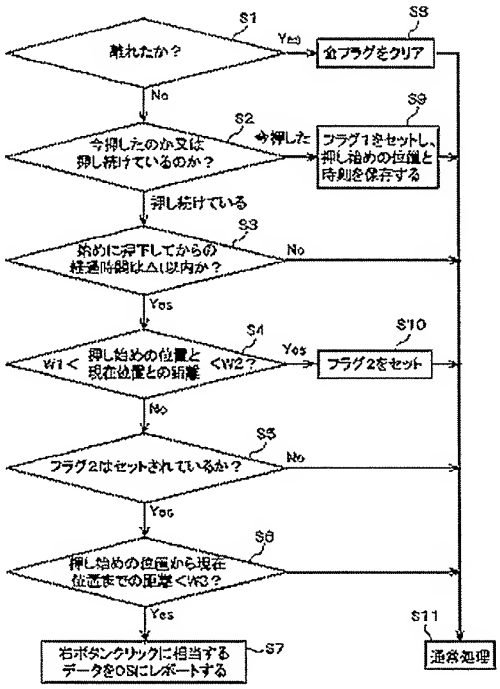

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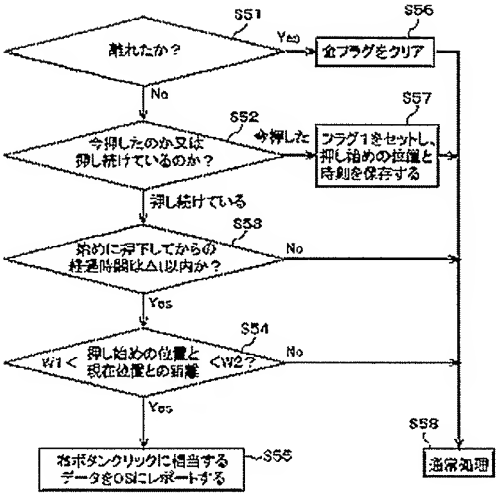

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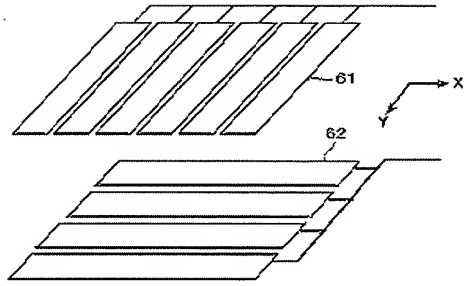
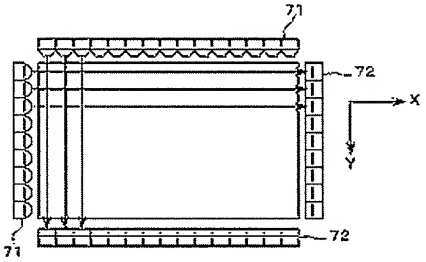
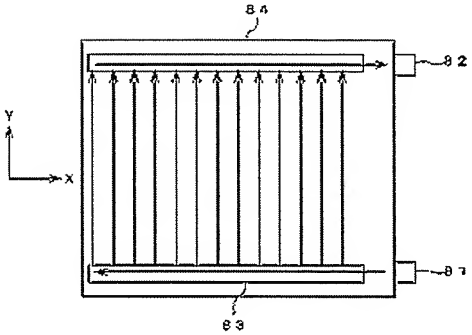


【図７】



【図８】



【図９】

方式	複数点押下時の入力座標	解像度	その他の特徴
マトリックス	コントローラに依存	低	キャリブレーション不要、傷に強い
光走査	コントローラに依存	低	キャリブレーション不要、傷に強い
容量結合	中点	高	触れるだけ、要専用ペン、傷に弱い
弾性表面波	コントローラに依存	高	触れるだけ、要専用ペン、傷に強い

フロントページの続き

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